GILKERSON

Effect of Fast and Slow Milking on the Production of Butter Fat

Dairy Husbandry
B. S.
1 9 0 5

THE EFFECT OF FAST AND SLOW MILKING
ON THE
PRODUCTION OF MILK AND BUTTER FAT

BY

THOMAS JOHN GILKERSON

Thesis for the Degree of Bachelor of Science
in Dairy Husbandry

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UNIVERSITY OF ILLINOIS

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May 27 1905

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Thomas John Gilkerson

ENTITLED The Effect of Fast and Slow Milking on the Production of Milk and Butter Fat

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF Bachelor of Science

F. J. Fraser

HEAD OF DEPARTMENT OF Dairy Husbandry

THE EFFECT OF FAST AND SLOW MILKING ON THE PRODUCTION OF MILK AND BUTTER FAT.

PREFACE.

There having been no previous experiments upon this subject of fast versus slow milking; it has been difficult to get at the subject in the best manner, and due to the lack of more numerous and systematic investigations the conclusions are rather prematurely drawn.

Experiments have been tried by both the Wisconsin and the Cornell Stations on "Methods of Milking" but they are particularly related to manipulation of the udder and stripping. The conclusion of the Wisconsin Bulletin No. 96, is that the production of milk and butter fat can be materially increased by manipulating the udder. The conclusion drawn from the Cornell Bulletin 213 is that an increased production can be obtained either by manipulating the udder or by stripping.

Knowing the prevailing idea to be that fast milking will give better results than slow milking; it is the purpose of this investigation to determine whether or not this supposition is true.

THE EFFECT OF FAST AND SLOW MILKING ON THE PRODUCTION OF MILK AND BUTTER FAT.

General Explanation.

The following investagative work is divided into three distinct periods preceded by a preliminary stage to show how cows would vary in their production of milk and butter fat from day to day under ordinary conditions. These periods into which the work is devided are as follows:

First; A period of six weeks during three of which the cows were milked slowly, while during the other three they were milked rapidly.

Second; A period of twenty-two days eleven of which the cows were milked slowly and the other eleven fast, and in alternate order.

Third; A period of twenty days ten of which the cows were milked slowly and during the other ten rapidly alternating every other two days.

For this work four of the Experiment Station cows were used, namely Rose 3d., Rose 4th., Lady Pietertje Parthenea and Zyder Zee Agnes 3d.. Rose 3d. and Rose 4th. are half sisters and grade Holstein Fresians while Lady Pietertje Parthenea and Zyder Zee Agnes 3d. are pure bred Holstein Fresians. These four cows were selected with the object of securing animals of desirable nervous temperament and uniform habits of production. Another reason for selecting them was to get two comparatively young cows in Rose 4th. and Zyder Zee Agnes 3d., while in Rose 3d. and Lady Pietertje Parthenea we would have what would be termed old cows.

In each of the periods two of the cows were milked slowly while

the other two were milkied fast and vice versa so that an old and a young cow were being milked slowly while the other old and the other young cow were being milked rapidly. This arrangement was resorted to so that all external conditions such as weather and age would have equal chance to effect the cows during the periods of fast and of slow milking.

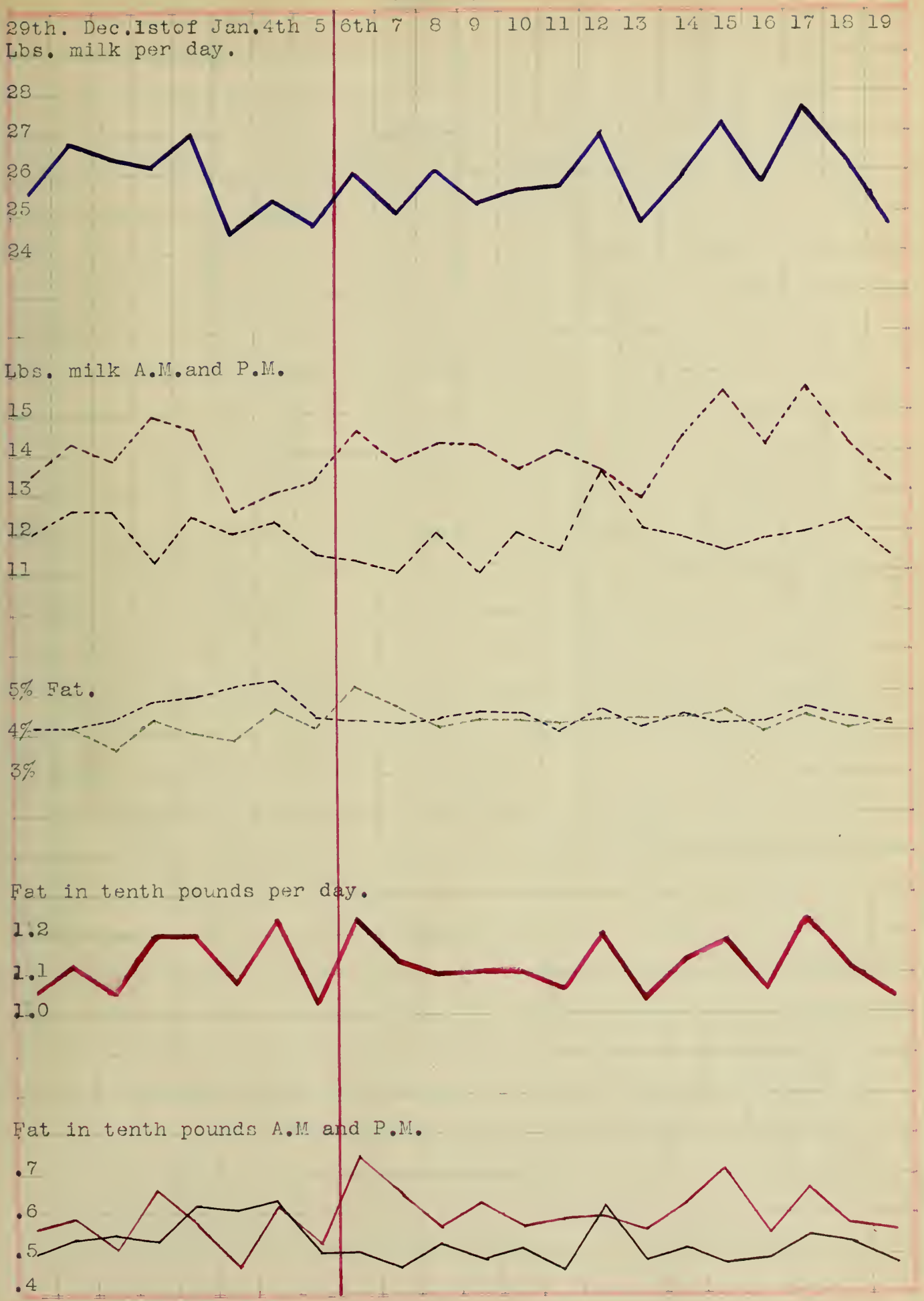
The curves on the next four pages indicate respectively the variation from day to day in the performance of the four different cows during the preliminary stage. In the remainder of this presentation the preliminary work and each of the three periods into which the work is divided will be discussed separately and the conclusions bearing upon each period will be there presented.

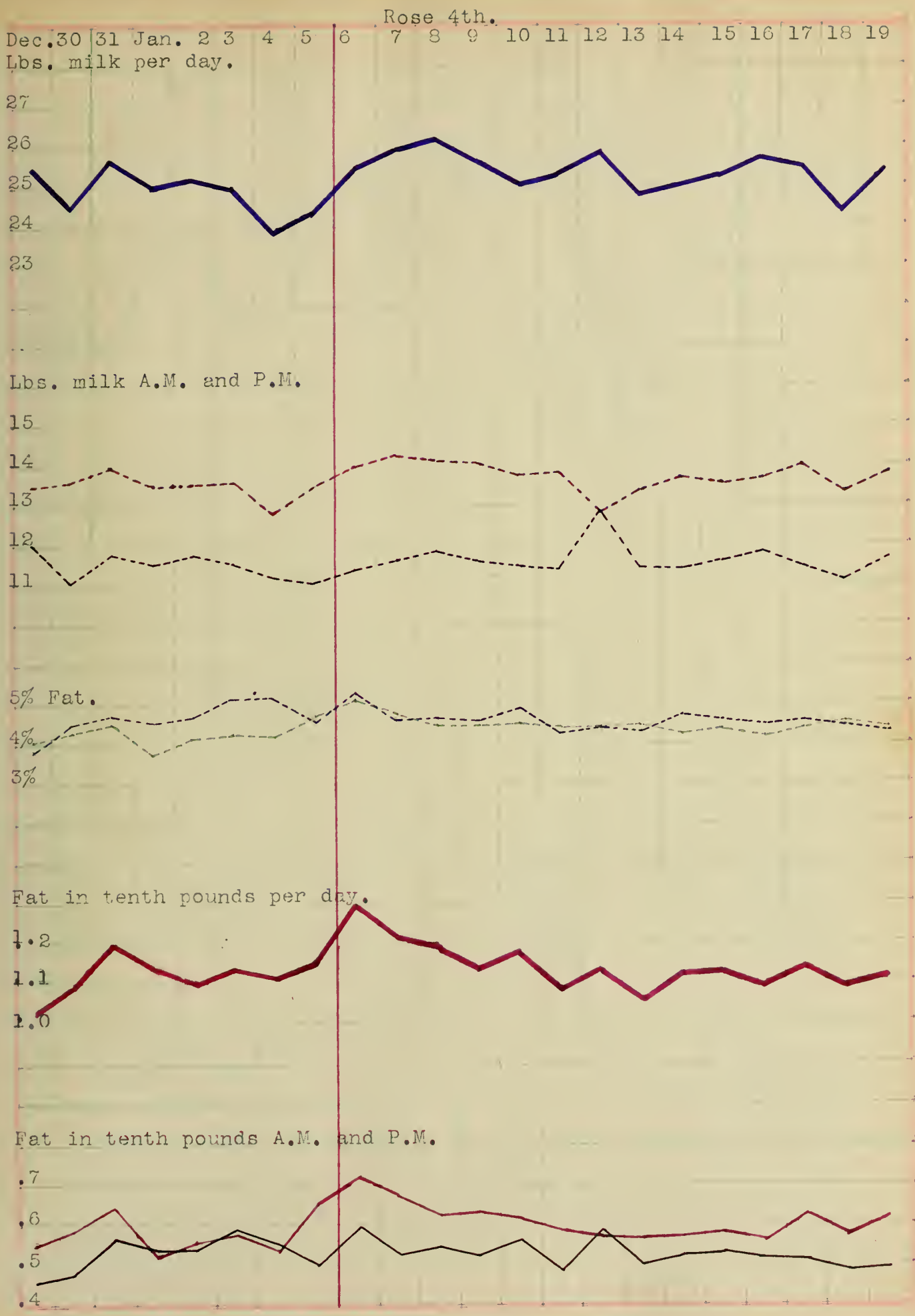
Identification of Curves.

The curves may be identified as follows.

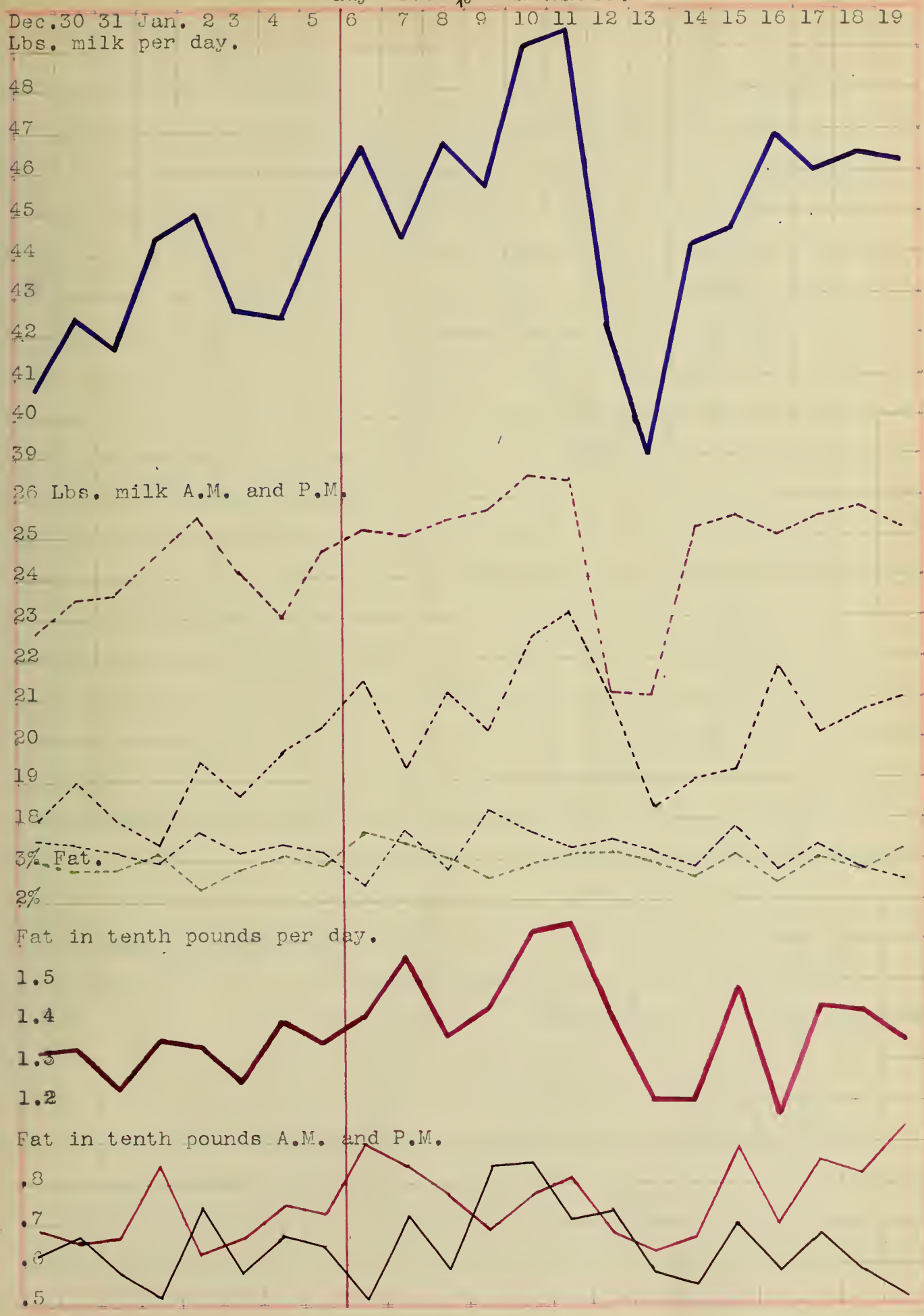
————————	Total amount of milk given each day.
- - - - - - - - - - - - - - - -	Amount of milk given in the morning.
- - - - - - - - - - - - - - - - - - - -	Amount of milk given in the evening.
- - - - - - - - - - - - - - - - - - - -	Test of the morning milk.
- - - - - - - - - - - - - - - - - - - -	Test of the evening milk.
————————	Total amount of fat produced per day.
————————	Amount of fat produced in the morning.
————————	Amount of fat produced in the evening.

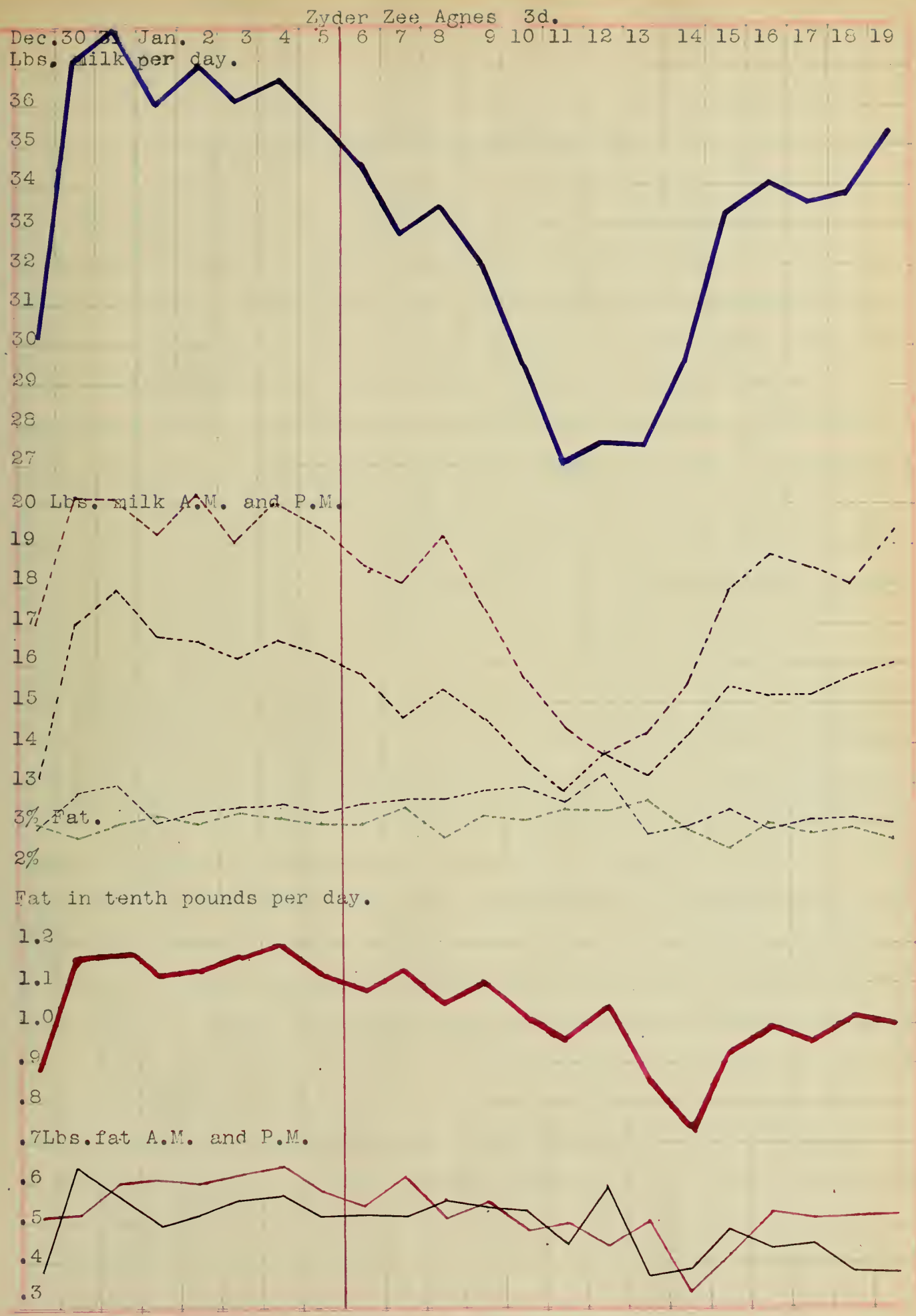
Rose 3d.


29th. Dec. 1st of Jan. 4th 5 6th 7 8 9 10 11 12 13 14 15 16 17 18 19
Lbs. milk per day.
28
27
26
25
24
Lbs. milk A.M. and P.M.
15
14
13
12
11
5% Fat.
4%
3%
Fat in tenth pounds per day.
1.2
1.1
1.0
Fat in tenth pounds A.M and P.M.
.7
.6
.5
.4


Rose 4th.
Dec.30 31 Jan. 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Lbs. milk per day.
27
26
25
24
23
Lbs. milk A.M. and P.M.
15
14
13
12
11
5% Fat.
4%
3%
Fat in tenth pounds per day.
1.2
1.1
1.0
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4

Lady Pietertje Parthenea.




Zyder Zee Agnes 3d.
Dec.30 31 Jan. 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Lbs. milk per day.
36
35
34
33
32
31
30
29
28
27
20 Lbs. milk A.M. and P.M.
19
18
17
16
15
14
13
3% Fat.
2%
Fat in tenth pounds per day.
1.2
1.1
1.0
.9
.8
.7Lbs.fat A.M. and P.M.
.6
.5
.4
.3

DISCUSSION OF PRELIMINARY PERIOD.

The red lines drawn through both the four preceding pages of curves and the four following pages of figures indicate the point where a change in milkers occured. A little increase in production may be noted at first in favor of the change in three out of the four cases, while with Zyder Zee Agnes 3d., the fourth cow, a decided drop can be noted. This drop may have been due to the fact that she was changed to a poorer milker, which was not true with the other three cows, but it was more probably due to the condition of her health for on the morning of January eleventh she was decidedly off feed. She was off feed for four days and then seemed to get back to about her normal flow again before starting the six week period. It is not the purpose of this thesis however to take into consideration change of milkers and it does not enter into the investigation except during this the first of part of the preliminary stage. Lady Pietertje Parthenea was also off feed on January twelth and thirteenth.

Nothing can be drawn from this preliminary work except that especially in the cases of Rose 3d. and Rose 4th. variations are noted from day to day which could not be attributed to changes of weather or other external conditions as these were closely watched.

Conclusion:

Cows vary considerably in their production from day to day even though there is no apparent cause.

Rose 3d.

Date	lbs.milk	test	lbs. fat,
December 29th A.M.	13.6	4.1	.5576
Dec. 29th P.M.	12.	4.2	.504
Dec. 30th A.M.	14.3	4.1	.5863
Dec. 30th P.M.	12.6	4.2	.5292
Dec. 31st A.M.	13.9	3.7	.5143
Dec. 31st P.M.	12.6	4.4	.5544
January 1st. A.M.	15.	4.4	.660
Jan. 1st P.M.	11.3	4.8	.5424
Jan. 2d A.M.	14.6	4.0	.584
Jan. 2d P.M.	12.4	5.0	.620
Jan. 3d A.M.	12.6	3.8	.4788
Jan. 3d P.M.	12.	5.1	.612
Jan. 4th A.M.	13.	4.7	.611
Jan. 4th P.M.	12.3	5.2	.6396
Jan. 5th A.M.	13.3	4.1	.5453
Jan. 5th P.M.	11.5	4.4	.506
Jan. 6th A.M.	14.6	5.1	.7446
Jan. 6th P.M.	11.4	4.4	.506
Jan. 7th A.M.	13.9	4.7	.6533
Jan. 7th P.M.	11.	4.3	.473
Jan. 8th A.M.	14.1	4.1	.5781
Jan. 8th P.M.	12.	4.4	.528
Jan. 9th A.M.	14.2	4.3	.6106
Jan. 9th P.M.	11.	4.5	.495
Jan. 10th A.M.	13.5	4.3	.5805
Jan. 10th P.M.	12.	4.5	.528
Jan. 11th A.M.	14.	4.2	.588
Jan. 11th P.M.	11.6	4.	.464
Jan. 12th A.M.	13.5	4.3	.5805
Jan. 12th P.M.	13.5	4.6	.621
Jan. 13th A.M.	12.8	4.3	.5504
Jan. 13th P.M.	12.	4.1	.492
Jan. 14th. A.M.	14.3	4.3	.6149
Jan. 14th P.M.	11.8	4.4	.5192
Jan. 15th A.M.	15.6	4.5	.7020
Jan. 15th P.M.	11.5	4.2	.4830
Jan. 16th A.M.	14.1	4.0	.564
Jan. 16th P.M.	11.7	4.2	.4914
Jan. 17th A.M.	15.6	4.4	.6864
Jan. 17th P.M.	11.9	4.6	.5474
Jan. 18th A.M.	14.1	4.1	.5781
Jan. 18th P.M.	12.2	4.4	.5368
Jan. 19th A.M.	13.2	4.3	.5676
Jan. 19th P.M.	11.5	4.2	.483

Rose 4th.

Date			lbs.milk	test	lbs. fat,
December	29th	A.M.	13.5	4.	.540
Dec.	29th	P.M.	12.	3.9	.468
Dec.	30th	A.M.	13.6	4.4	.5984
Dec.	30th	P.M.	11	4.4	.484
Dec.	31st	A.M.	14.	4.5	.630
Dec.	31st	P.M.	11.7	4.8	.5616
January	1st	A.M.	13.5	3.8	.513
Jan.	1st	P.M.	11.5	4.6	.529
Jan.	2d	A.M.	13.5	4.1	.5535
Jan.	2d	P.M.	11.7	4.7	.5499
Jan.	3d	A.M.	13.5	4.2	.567
Jan.	3d	P.M.	11.5	5.1	.5865
Jan.	4th	A.M.	12.8	4.2	.5376
Jan.	4th	P.M.	11.1	5.1	.5661
Jan.	5th	A.M.	13.4	4.9	.6566
Jan.	5th	P.M.	11.	4.6	.506
Jan.	6th	A.M.	14.	5.1	.714
Jan.	6th	P.M.	11.4	5.2	.5928
Jan.	7th	A.M.	14.3	4.7	.6721
Jan.	7th	P.M.	11.6	4.7	.5452
Jan.	8th	A.M.	14.2	4.4	.6248
Jan.	8th	P.M.	11.9	4.7	.5593
Jan.	9th	A.M.	14.1	4.4	.6204
Jan.	9th	P.M.	11.6	4.5	.5220
Jan.	10th	A.M.	13.7	4.5	.6165
Jan.	10th	P.M.	11.4	4.9	.5585
Jan.	11th	A.M.	13.9	4.3	.5977
Jan.	11th	P.M.	11.3	4.3	.4859
Jan.	12th	A.M.	12.9	4.3	.5547
Jan.	12th	P.M.	12.9	4.4	.5676
Jan.	13th	A.M.	13.2	4.3	.5676
Jan.	13th	P.M.	11.5	4.3	.4945
Jan.	14th	A.M.	13.7	4.2	.5754
Jan.	14th	P.M.	11.3	4.7	.5311
Jan.	15th	A.M.	13.6	4.3	.5848
Jan.	15th	P.M.	11.6	4.6	.5336
Jan.	16th	A.M.	13.7	4.1	.5617
Jan.	16th	P.M.	11.9	4.4	.5236
Jan.	17th	A.M.	14.	4.4	.616
Jan.	17th	P.M.	11.4	4.5	.513
Jan.	18th	A.M.	13.4	4.4	.5896
Jan.	18th	P.M.	11	4.4	.484
Jan.	19th	A.M.	13.8	4.4	.6072
Jan.	19th	P.M.	11.6	4.3	.4988

Lady Pietertje Parthenea.

Date	lbs. milk	test	lbs. fat,
December 29th A.M.	22.7	3.	.681
Dec. 29th P.M.	18.	3.5	.630
Dec. 30th A.M.	23.5	2.8	.658
Dec. 30th P.M.	19.	3.5	.665
Dec. 31st A.M.	23.7	2.8	.6636
Dec. 31st P.M.	18.	3.2	.576
January 1st A.M.	26.8	3.2	.8576
Jan. 1st.P.M.	17.5	3.	.525
Jan. 2d A.M.	25.5	2.4	.612
Jan. 2d P.M.	19.5	3.8	.740
Jan. 3d A.M.	24.1	2.8	.6748
Jan. 3d P.M.	18.7	3.2	.5984
Jan. 4th A.M.	23.	3.2	.736
Jan. 4th P.M.	19.6	3.4	.6664
Jan. 5th A.M.	24.6	2.9	.7134
Jan. 5th P.M.	20.2	3.2	.6464
Jan. 6th A.M.	25.1	3.6	.9036
Jan. 6th P.M.	21.4	2.4	.5136
Jan. 7th A.M.	25	3.4	.850
Jan. 7th P.M.	19.4	3.7	.7178
Jan. 8th A.M.	25.4	3.1	.7874
Jan. 8th P.M.	21.1	2.8	.5908
Jan. 9th A.M.	25.7	2.7	.6939
Jan. 9th P.M.	20.1	4.2	.8442
Jan. 10th A.M.	26.6	2.9	.7714
Jan. 10th P.M.	22.4	3.8	.8512
Jan. 11th A.M.	26.4	3.1	.8184
Jan. 11th P.M.	23.	3.1	.713
Jan. 12th A.M.	21.1	3.3	.6963
Jan. 12th P.M.	21.1	3.5	.7385
Jan. 13th A.M.	20.5	3.	.615
Jan. 13th P.M.	18.3	3.2	.5856
Jan. 14th A.M.	25.1	2.6	.6526
Jan. 14th P.M.	19.	2.9	.551
Jan. 15th A.M.	25.5	3.1	.7905
Jan. 15th P.M.	19.1	3.7	.7067
Jan. 16th A.M.	25.	2.4	.600
Jan. 16th P.M.	21.8	2.7	.5886
Jan. 17th A.M.	25.5	3.	.765
Jan. 17th P.M.	20.5	3.3	.6765
Jan. 18th A.M.	25.8	2.8	.7224
Jan. 18th P.M.	20.6	2.9	.5974
Jan. 19th A.M.	25.2	3.3	.8316
Jan. 19th P.M.	21.	2.5	.525

Zyder Zee Agnes 3d.

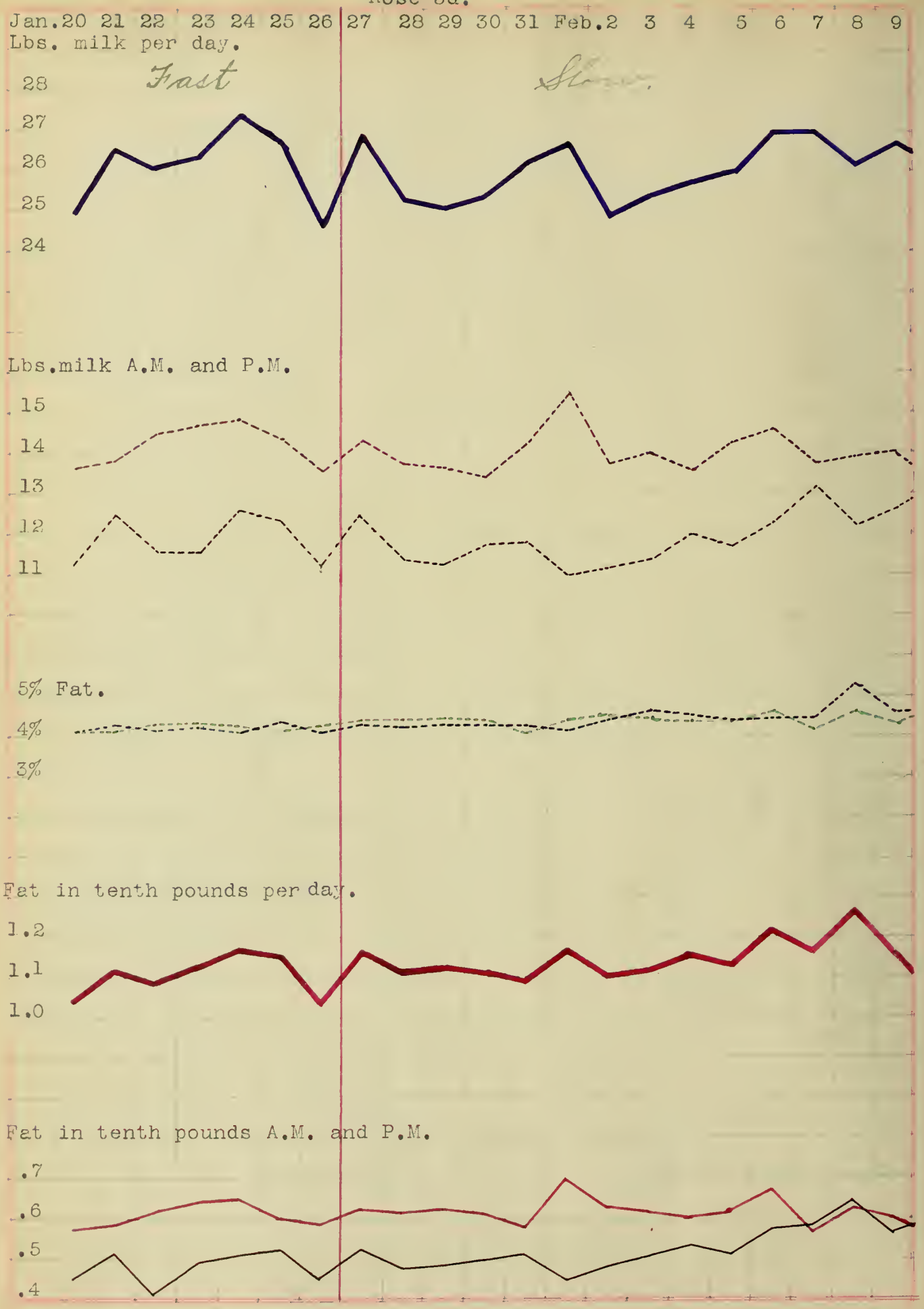
Date	lbs.milk	test	lbs.fat,
December 29th A.M.	17	3.	.510
Dec. 29th P.M.	13.1	2.9	.3799
Dec. 30th A.M.	20.1	2.6	.5226
Dec. 30th P.M.	17.	3.8	.646
Dec. 31st A.M.	20.1	3.	.603
Dec. 31st P.M.	17.9	4.	.716
January 1st A.M.	19.2	3.2	.6144
Jan. 1st P.M.	16.8	3.	.504
Jan. 2d A.M.	20.2	3.	.6060
Jan. 2d P.M.	16.7	3.2	.5344
Jan. 3d A.M.	19.	3.3	.627
Jan. 3d P.M.	16.2	3.4	.5508
Jan. 4th A.M.	20.	3.2	.640
Jan. 4th P.M.	16.6	3.4	.5644
Jan. 5th A.M.	19.4	3	.5820
Jan. 5th P.M.	16.2	3.3	.5346
Jan. 6th A.M.	18.6	3.	.558
Jan. 6th P.M.	15.8	3.4	.5372
Jan. 7th A.M.	18.	3.4	.612
Jan. 7th P.M.	14.7	3.6	.5292
Jan. 8th A.M.	19.1	2.7	.5157
Jan. 8th P.M.	15.3	3.6	.5508
Jan. 9th A.M.	17.4	3.2	.5568
Jan. 9th P.M.	14.6	3.8	.5548
Jan. 10th A.M.	15.7	3.1	.4867
Jan. 10th P.M.	13.7	3.9	.5343
Jan. 11th A.M.	14.4	3.5	.5040
Jan. 11th P.M.	12.6	3.6	.4536
Jan. 12th A.M.	13.8	4.3	.4554
Jan. 12th P.M.	13.8	4.3	.5934
Jan. 13th A.M.	14.2	3.6	.5112
Jan. 13th P.M.	13.2	2.7	.3564
Jan. 14th A.M.	15.4	2.8	.4312
Jan. 14th P.M.	14.2	2.8	.3976
Jan. 15th A.M.	17.9	2.4	.4296
Jan. 15th P.M.	15.4	3.2	.4928
Jan. 16th A.M.	18.8	2.9	.5452
Jan. 16th P.M.	15.2	2.9	.4408
Jan. 17th A.M.	18.4	2.8	.5152
Jan. 17th P.M.	15.2	3.	.456
Jan. 18th A.M.	18.	2.9	.522
Jan. 18th P.M.	15.8	3.1	.4898
Jan. 19th A.M.	19.3	2.7	.5211
Jan. 19th P.M.	16.	3.	.480

THE SIX WEEK PERIOD.

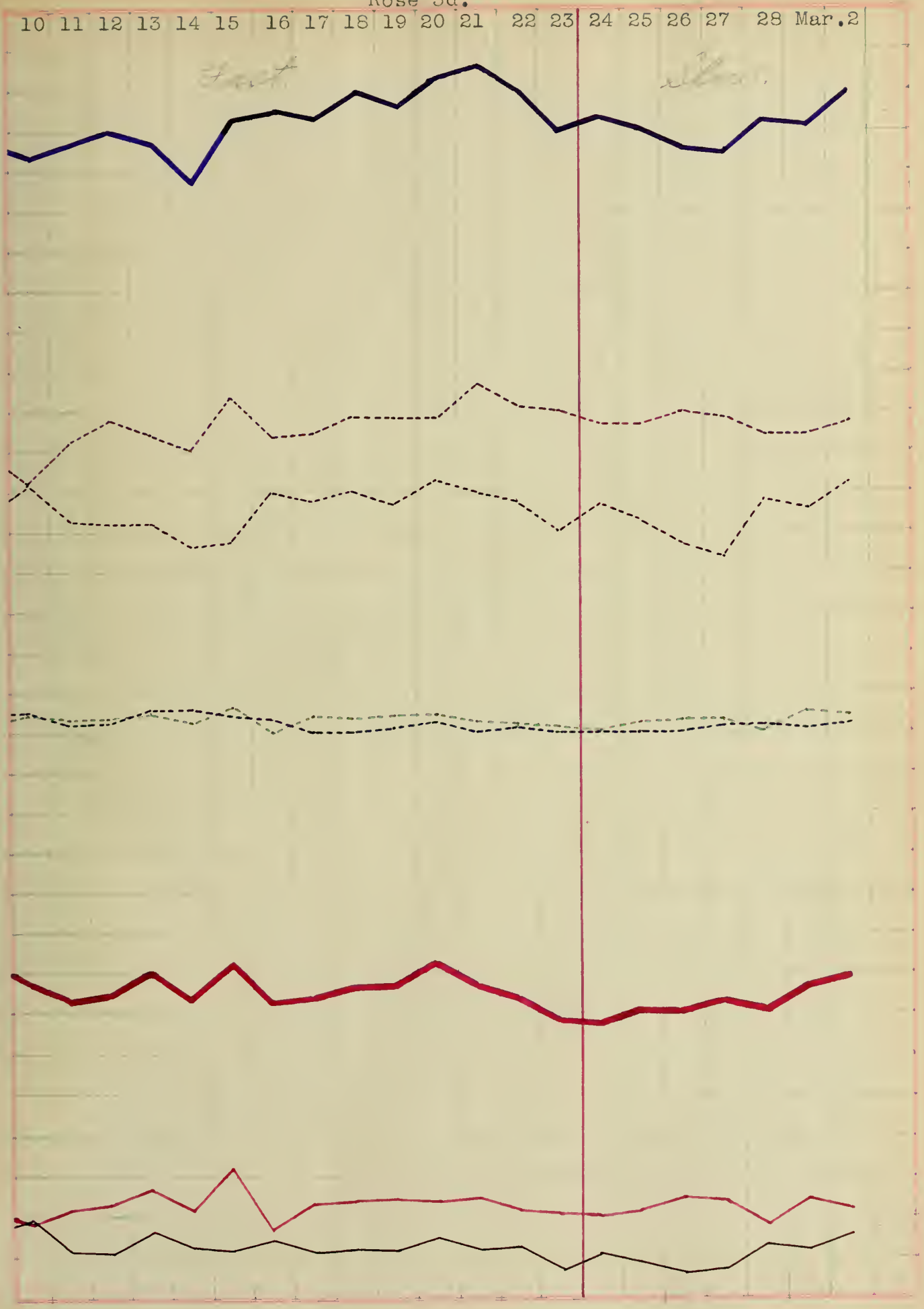
This six week period was devided so as to get three weeks of fast and three weeks of slow milking which would make a fair comparison. The last one of the six weeks would of course be considerably farther along in the period of lactation and in order to balance the fast and the slow milking properly, in the case of Rose 3d. and Zyder Zee Agnes 3d., they were milked fast the first week, slow the second and third weeks and fast again the fourth and fifth weeks and slow the sixth week; throwing the first, fourth and fifth weeks against the second, third and sixth weeks. The same plan was followed with Rose 4th. and Lady Pietertje Parthenea except that the speed was reversed, they being milked slow the first week fast the second and third weeks, slow again the fourth and fifth weeks and fast the sixth week.

In the following eight pages of curves which cover the six week period, two pages are devoted to each cow. Each page contains curves representing three weeks and the red lines drawn through each page as well as the border lines between the two pages represent the time when the change of speed in milking were made.

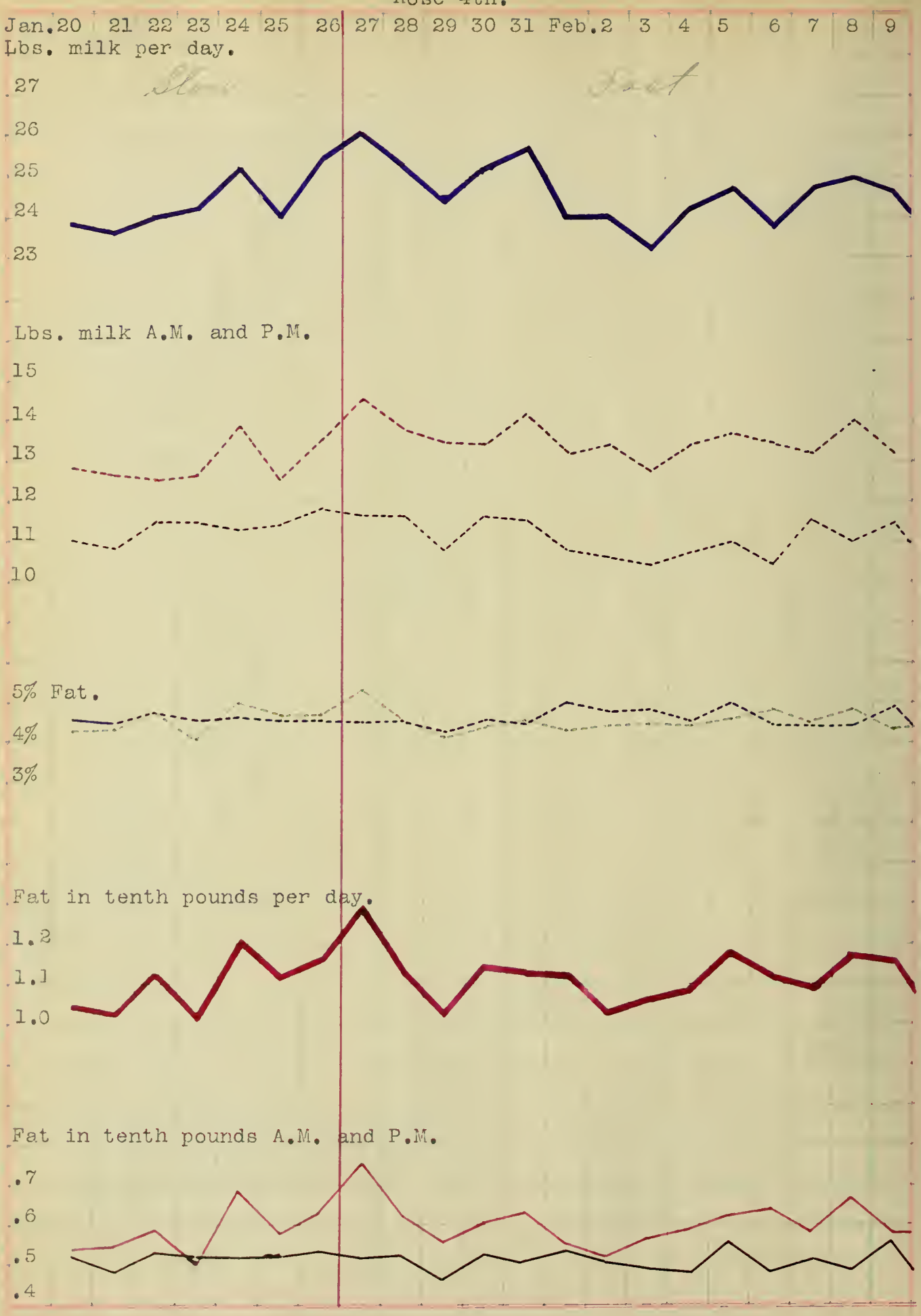
Rose 3d.


Jan.20 21 22 23 24 25 26 27 28 29 30 31 Feb.2 3 4 5 6 7 8 9
Lbs. milk per day.
Fast
Slow
28
27
26
25
24
Lbs.milk A.M. and P.M.
15
14
13
12
11
5% Fat.
4%
3%
Fat in tenth pounds per day.
1.2
1.1
1.0
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4

Rose 3d.



Rose 4th.


Jan. 20 21 22 23 24 25 26 27 28 29 30 31 Feb. 2 3 4 5 6 7 8 9
Lbs. milk per day.
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5% Fat.
4%
3%
Fat in tenth pounds per day.
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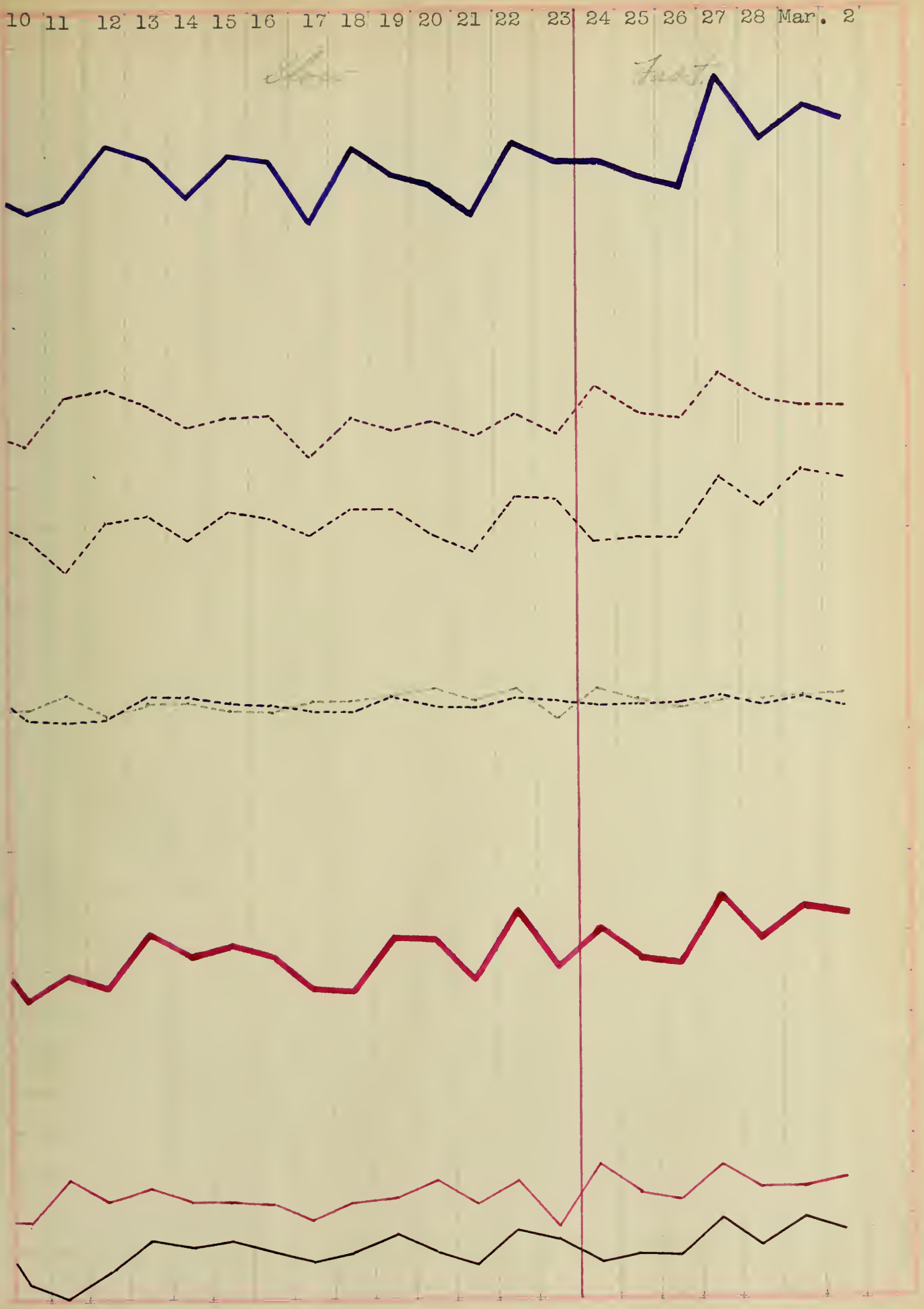
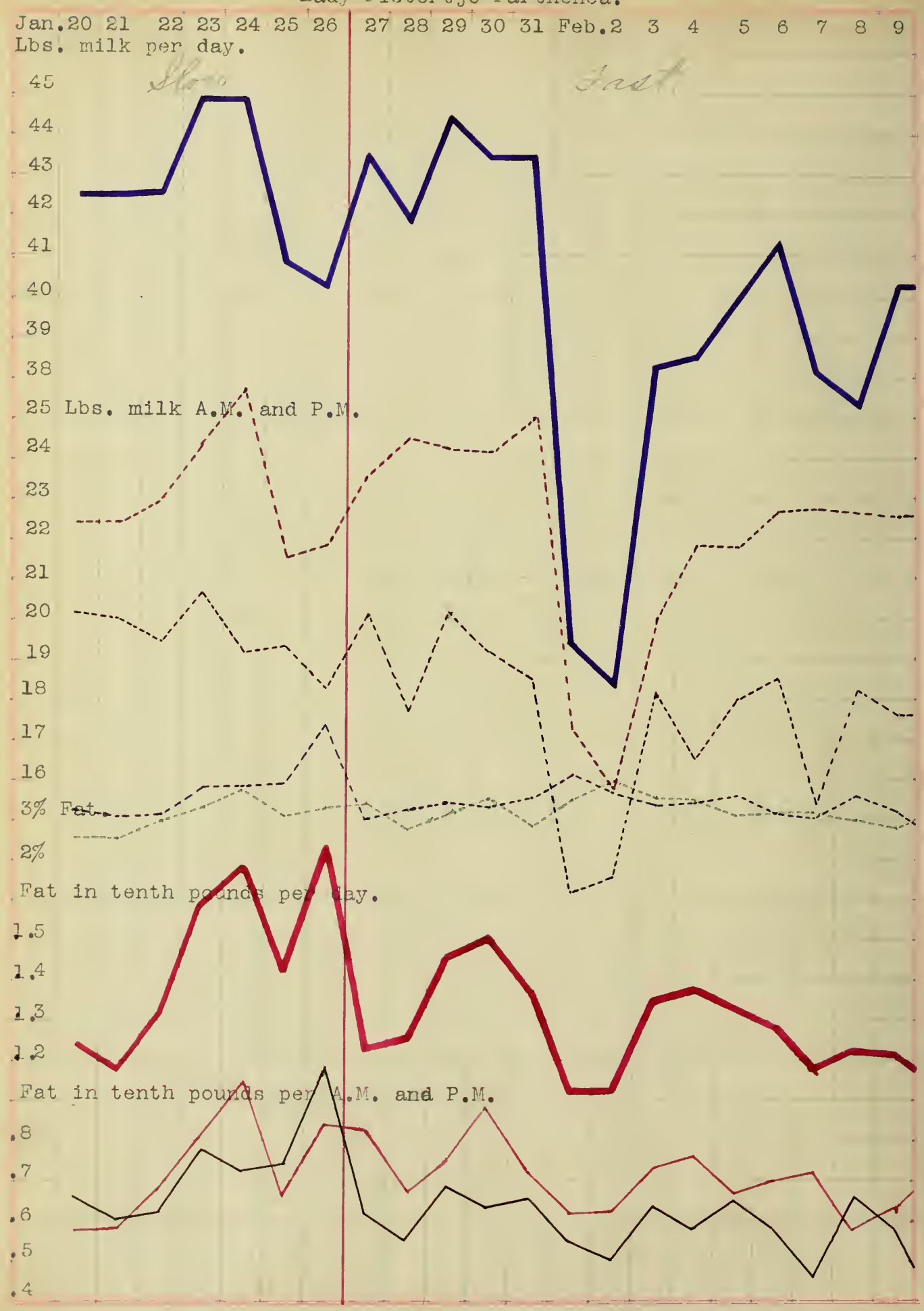
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4

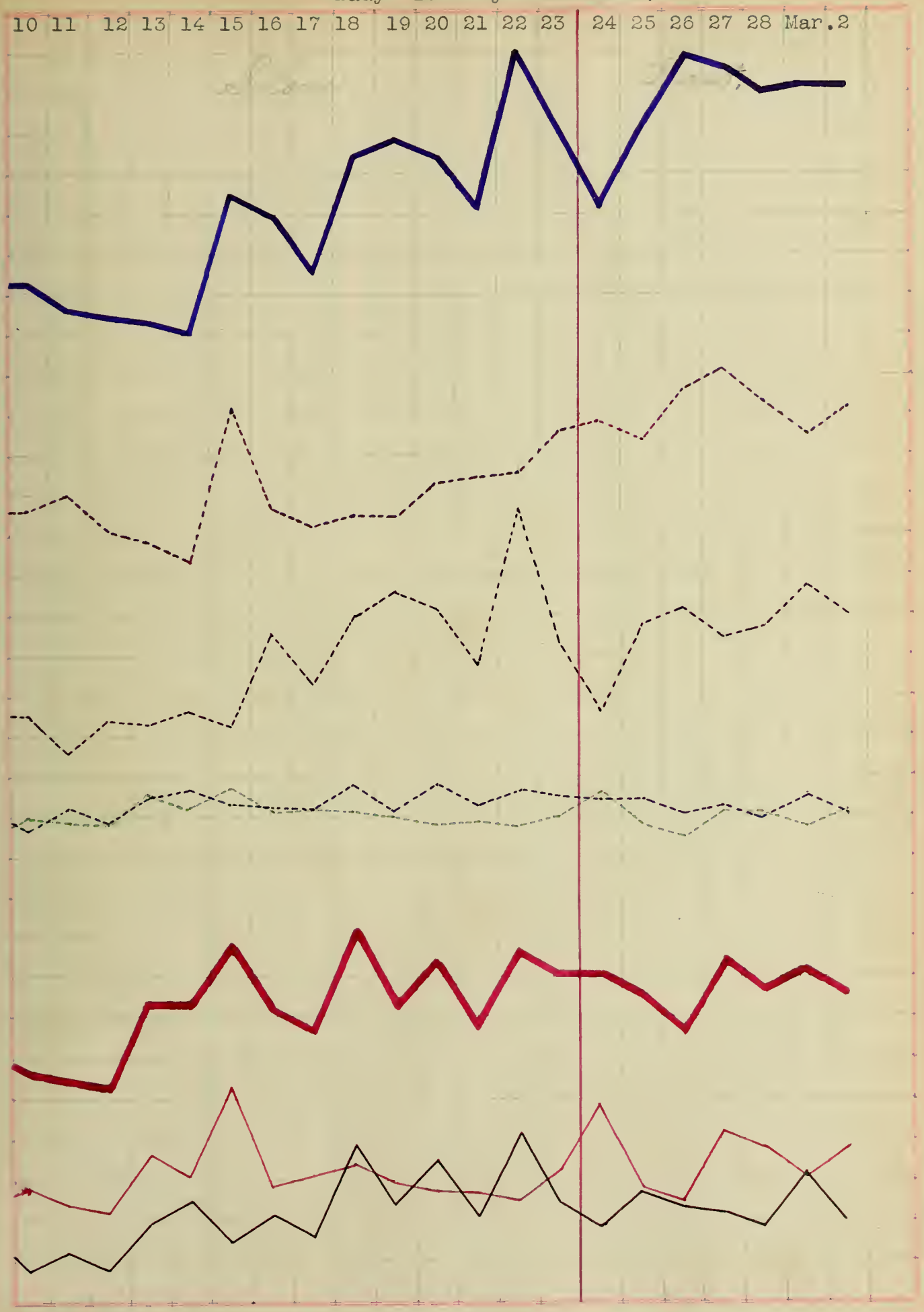
Rose 4th.



Lady Pietertje Parthenea.

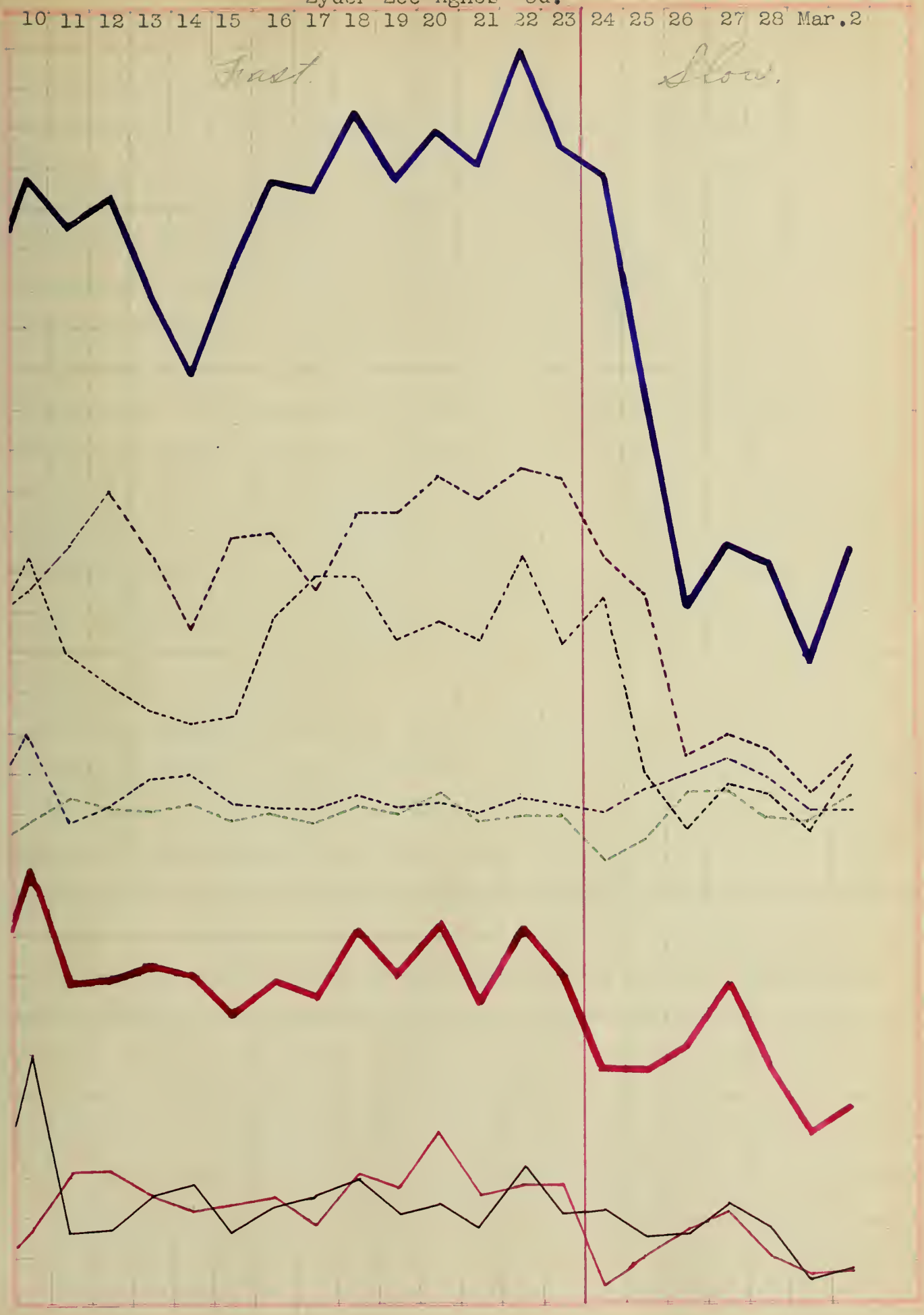


Lady Pietertje Parthenea.



Zyder Zee Agnes 3d.

Zyder Zee Agnes 3d.



DISCUSSION OF THE SIX WEEK PERIOD.

This period of the investigation does not prove much about fast or slow milking, since out of the four cases two cows produced more butter fat during the three weeks of fast milking while the other two produced more during the slow milking.

It does however show conclusively that cows will soon adjust themselves to a change. Each of the four cows usually showed a change in favor of the fast milking for the first two or three milkings and would then aparently become accustomed to the change and no further effect could be noted.

Zyder Zee Agnes 3d's. drop in milk flow on January twenty-sixth was very sudden and can be traced to no particular cause, but she came up in test so that her production for the day was average, then the next day when the speed of milking was changed from fast to slow she dropped off considerably in fat production and gradually came back to normal as she became accustomed to the slow milking. On February twenty-fifth the day after she was again changed from fast to slow milking she made a decided drop in her production. These changes were very pronounced and occurred both times just as the change from fast to slow milking was made. Therefore it is safe to attribute the sudden drop in both cases to the change from fast to slow milking.

Lady Pietertje Parthenea's sudden drop on February first was due entirely to sickness for she was taken with chills and fever and had to be blanketed and removed to a box stall. Her sickness interfered considerably with the investigation during this period but it did not injure the results of the two succeding periods.

It was due to this sickness that she gave such marked results in favor of the three weeks of slow against the three weeks of fast milking. On the other hand it was the two decided drops caused by the change in speed of milking that caused Zyder Zee Agnes 3d's record to show up so strongly in favor of the rapid milking.

Therefore the conclusion drawn from the work shown in the curves on the preceding pages and in the comparison of the figures on the next page is, that in this six week period, although the figures show that there was not a decided variation in favor of the fast milking yet the change from rapid to slow milking caused a lowering in the production for a short time. The cows however, becoming accustomed to the condition came back to their normal flow and in so short a time that a change in the production over as long periods as these, could not be noted in favor of either the fast or the slow milking.

Conclusion:

Cows are influenced in their production by slow or rapid milking and will fall off in production when changed from rapid to slow milking, but will adapt themselves to slow milking so quickly that it will not perceptibly lower the production for a long period. The change from rapid to slow milking is more the cause of the lower production than the actual slow milking.

SIX WEEK PERIOD.

TABLE 1.

Table showing comparison of totals for the four cows during the six week period.

Rose 3d.

1st. week fast milking - - - -	182.2 lbs. milk	- -	7.7412 lbs fat.
4th. and 5th. week fast milking	381.7 lbs. milk	-	-16.3248 lbs fat.
Total for 3 wks. fast milking	563.9 lbs. milk	-	-24.0660 lbs.fat.
2d.and 3d. weeks slow milking -	363.9 lbs milk	-	-16.1938 lbs fat.
6th week slow milking - - - - -	189.5 lbs. milk	-	- 7.9161 lbs fat.
Total for 3wks. slow milking	553.4 lbs. milk	-	-24.1099 lbs.fat.

Rose 4th.

2d. and 3d. weeks fast milking	344.8 lbs. milk	-	-15.8037 lbs. fat.
6th. week fast milking - - - -	179.4 lbs. milk	-	- 8.4871 lbs. fat.
Total for 3wks. fast milking	524.2 lbs. milk	-	-24.2908 lbs. fat.
1st. week slow milking - - - -	170.1 lbs. milk	-	- 7.7415 lbs. fat.
4th and 5th weeks slow milking	345.8 lbs. milk	-	-15.9251 lbs. fat.
Total for 3 wks. slow milking	515.9 lbs. milk	-	-23.6666 lbs. fat.

Lady Pietertje Parthenea.

2d. and 3d. weeks fast milking	549.9 lbs. milk	-	-18.252 lbs. fat.
6th. week fast milking - - - -	313.1 lbs. milk	-	- 9.7281 lbs. fat.
Total for 3 wks. fast milking	863.0 lbs. milk	-	-27.9801 lbs. fat.
1st. week slow milking - - - -	298. lbs. milk	-	-10.1548 lbs. fat.
4th.and 5th.weeks slow milking	585.2 lbs. milk	-	-18.6767 lbs. fat.
Total for 3 wks. slow milking	883.2 lbs. milk	-	-28.8315 lbs. fat.

Zyder Zee Agnes 3d.

1st.week fast milking - - - -	225.5 lbs. milk	- -	7.5244 lbs. fat.
4th.and 5th.weeks fast milking	488.9 lbs. milk	-	-15.856 lbs. fat.
Total for 3 wks. fast milking	714.4 lbs. milk	-	-23.3804 lbs. fat.
2d. and 3d. weeks slow milking	466.8 lbs. milk	-	-14.4378 lbs. fat.
6th. week slow milking - - - -	194.2 lbs. milk	-	- 6.1297 lbs. fat.
Total for 3 wks. slow milking	661. lbs. milk	-	-20.5676 lbs. fat.

The figures from which the totals are take are on the following eight pages and for a close study of the variations they should be consulted.

Rose 3d.

-----Six week period.-----

Three weeks of slow and three weeks of fast milking.

First week -- Speed of milking - Fast.

Date	lbs. milk	test	lbs. fat,
January 20th A.M.	13.7	4.2	.575
Jan. 20th P.M.	11.3	4.1	.4633
Jan. 21st A.M.	13.9	4.2	.5838
Jan. 21st P.M.	12.4	4.3	.5332
Jan. 22d A.M.	14.5	4.3	.6235
Jan. 22d P.M.	11.5	4.1	.4715
Jan. 23d A.M.	14.7	4.4	.6468
Jan. 23d P.M.	11.6	4.3	.4988
Jan. 24th A.M.	14.8	4.4	.6512
Jan. 24th P.M.	12.5	4.1	.5125
Jan. 25th A.M.	14.4	4.2	.6048
Jan. 25th P.M.	12.3	4.4	.5412
Jan. 26th A.M.	13.5	4.3	.5805
Jan. 26th P.M.	11.1	4.1	.4551
Total first week	182.2 fast milking		7.7412

Second and third week - Speed of milking - Slow.

Jan. 27th A.M.	14.4	4.4	.6336
Jan. 27th P.M.	12.5	4.3	.5375
Jan. 28th A.M.	13.8	4.5	.6210
Jan. 28th P.M.	11.5	4.3	.4945
Jan. 29th A.M.	13.7	4.6	.6302
Jan. 29th P.M.	11.3	4.4	.4972
Jan. 30th A.M.	13.6	4.5	.6120
Jan. 30th P.M.	11.7	4.3	.5031
Jan. 31st A.M.	14.3	4.1	.5863
Jan. 31st P.M.	11.9	4.3	.5117
Feb. 1st A.M.	15.6	4.5	.7020
Feb. 1st P.M.	11.	4.2	.462
Feb. 2d A.M.	13.8	4.6	.6348
Feb. 2d P.M.	11.1	4.4	.4884
Feb. 3d A.M.	14.	4.4	.616
Feb. 3d P.M.	11.3	4.6	.5198
Feb. 4th A.M.	13.7	4.4	.6028
Feb. 4th P.M.	12.	4.5	.540
Feb. 5th A.M.	14.2	4.4	.6248
Feb. 5th P.M.	11.8	4.4	.5192
Feb. 6th A.M.	14.6	4.6	.6716
Feb. 6th P.M.	12.4	4.5	.5580
Feb. 7th.A.M.	13.8	4.2	.5796
Feb. 7th P.M.	13.2	4.5	.5940
Feb. 8th A.M.	13.9	4.5	.6255
Feb. 8th.P.M.	12.2	5.3	.6466
Feb. 9th A.M.	14.	4.3	.602
Feb. 9th P.M.	12.6	4.6	.5796
Total for 2d&3d week	363.9 Slow milking		16.1938

Rose 3d.

----- Six week period.-----

Fourth and fifth week - Speed of milking - Fast.

Date	lbs. milk	test	lbs. fat,
February 10th A.M.	13.2	4.4	.5808
Feb. 10th P.M.	13.2	4.5	.594
Feb. 11th A.M.	14.2	4.3	.6106
Feb. 11th P.M.	12.4	4.2	.5208
Feb. 12th A.M.	14.8	4.3	.6364
Feb. 12th P.M.	12.2	4.2	.5124
Feb. 13th A.M.	14.5	4.6	.6670
Feb. 13th P.M.	12.2	4.6	.5612
Feb. 14th A.M.	14.1	4.3	.6063
Feb. 14th P.M.	11.7	4.6	.5382
Feb. 15th A.M.	15.3	4.7	.7191
Feb. 15th P.M.	11.9	4.4	.5236
Feb. 16th A.M.	14.4	4.0	.5760
Feb. 16th P.M.	13.	4.3	.5590
Feb. 17th A.M.	14.5	4.4	.6380
Feb. 17th P.M.	12.8	4.	.512
Feb. 18th A.M.	14.9	4.3	.6407
Feb. 18th P.M.	13.	4.	.520
Feb. 19th A.M.	14.9	4.4	.6556
Feb. 19th P.M.	12.7	4.1	.5207
Feb. 20th A.M.	14.9	4.4	.6556
Feb. 20th P.M.	13.3	4.2	.5586
Feb. 21st A.M.	15.6	4.2	.6552
Feb. 21st P.M.	13.	4.	.520
Feb. 22d A.M.	15.2	4.1	.6232
Feb. 22d P.M.	12.8	4.1	.5248
Feb. 23d A.M.	15.	4.1	.615
Feb. 23d P.M.	12.	4.	.480
Total for 4th and 5th	381.7	Fast milking	16.3248

Sixth week - Speed of milking - Slow.

Feb. 24th A.M.	14.7	4.0	.588
Feb. 24th P.M.	12.7	4.0	.508
Feb. 25th A.M.	14.7	4.2	.6174
Feb. 25th P.M.	12.3	4.0	.4920
Feb. 26th A.M.	15.	4.3	.645
Feb. 26th P.M.	11.6	4.	.464
Feb. 27th A.M.	14.9	4.3	.6407
Feb. 27th P.M.	11.4	4.2	.4788
Feb. 28th A.M.	14.3	4.0	.572
Feb. 28th P.M.	12.9	4.2	.5418
March 1st.A.M.	14.4	4.5	.6480
March 1st P.M.	12.7	4.1	.5207
March 2d A.M.	14.7	4.3	.6321
March 2d P.M.	13.2	4.3	.5676
Total for sixth week	189.5	Slow milking	7.9161

Rose 4th.

----- Six week period.-----

Three weeks of slow and three weeks of fast milking.

First week - Speed of milking - Slow.

Date	lbs. milk		test	lbs. fat,
January 20th A.M.	12.9		4.2	.5418
Jan. 20th P.M.	11.		4.6	.506
Jan. 21st A.M.	12.7		4.3	.5461
Jan. 21st P.M.	10.9		4.5	.4905
Jan. 22d A.M.	12.5		4.7	.5875
Jan. 22d P.M.	11.5		4.7	.5405
Jan. 23d A.M.	12.7		4.	.508
Jan. 23d P.M.	11.5		4.5	.5175
Jan. 24th A.M.	13.8		5.	.690
Jan. 24th P.M.	11.3		4.6	.5198
Jan. 25th A.M.	12.6		4.7	.5922
Jan. 25th A.M.	11.4		4.6	.5244
Jan. 26th A.M.	13.4		4.7	.6298
Jan. 26th P.M.	11.9		4.6	.5474
Total first week	170.1	Slow milking		7.715

Second and third week - Speed of milking - Fast.

Jan. 27th A.M.	14.4		5.3	.7632
Jan. 27th P.M.	11.6		4.5	.5220
Jan. 28th A.M.	13.8		4.5	.6210
Jan. 28th P.M.	11.6		4.5	.5220
Jan. 29th A.M.	13.5		4.2	.5670
Jan. 29th P.M.	10.9		4.3	.4687
Jan. 30th A.M.	13.5		4.5	.6075
Jan. 30th P.M.	11.6		4.6	.5336
Jan. 31st A.M.	14.1		4.5	.6345
Jan. 31st P.M.	11.5		4.4	.5060
Feb. 1st A.M.	13.2		4.3	.5676
Feb. 1st P.M.	10.8		5.	.540
Feb. 2d A.M.	13.3		4.4	.5852
Feb. 2d P.M.	10.7		4.8	.5136
Feb. 3d A.M.	12.8		4.5	.5760
Feb. 3d P.M.	10.4		4.8	.4992
Feb. 4th A.M.	13.4		4.4	.5896
Feb. 4th P.M.	10.7		4.5	.4815
Feb. 5th A.M.	13.7		4.6	.6302
Feb. 5th P.M.	11.		5.	.550
Feb. 6th A.M.	13.4		4.8	.6432
Feb. 6th P.M.	10.5		4.5	.4725
Feb. 7th A.M.	13.2		4.4	.5808
Feb. 7th P.M.	11.5		4.5	.5175
Feb. 8th A.M.	14.		4.8	.6720
Feb. 8th P.M.	11.		4.5	.495
Feb. 9th A.M.	13.2		4.4	.5808
Feb. 9th P.M.	11.5		4.9	.5635
Total for 2d and 3d week	344.8	Fast milking		15.8037

Rose 4th.

----- Six week period.-----

Fourth and fifth week - Speed of milking - Slow.

Date	lbs. milk	test	lbs. fat,
February 10th A.M.	13.	4.4	.5720
Feb. 10th P.M.	10.8	4.1	.4428
Feb. 11th A.M.	14.2	4.9	.6958
Feb. 11th P.M.	9.9	4.1	.4059
Feb. 12th A.M.	14.4	4.3	.6192
Feb. 12th P.M.	11.1	4.2	.4662
Feb. 13th A.M.	14.	4.7	.6580
Feb. 13th P.M.	11.2	4.8	.5376
Feb. 14th A.M.	13.5	4.7	.6345
Feb. 14th P.M.	10.7	4.8	.5136
Feb. 15th A.M.	13.8	4.6	.6348
Feb. 15th P.M.	11.4	4.7	.5358
Feb. 16th A.M.	13.8	4.5	.6210
Feb. 16th P.M.	11.3	4.6	.5198
Feb. 17th A.M.	12.8	4.6	.5888
Feb. 17th P.M.	10.9	4.4	.4796
Feb. 18th A.M.	13.8	4.6	.6348
Feb. 18th P.M.	11.5	4.5	.5175
Feb. 19th A.M.	13.4	4.8	.6432
Feb. 19th P.M.	11.5	4.8	.5520
Feb. 20th A.M.	13.6	5.0	.6800
Feb. 20th P.M.	10.9	4.6	.5014
Feb. 21st A.M.	13.3	4.7	.6251
Feb. 21st P.M.	10.4	4.5	.4680
Feb. 22d A.M.	13.8	5.0	.6900
Feb. 22d P.M.	11.7	4.8	.5616
Feb. 23d A.M.	13.4	4.3	.5762
Feb. 23d P.M.	11.7	4.7	.5499
Total 4th and 5th wk.	345.8	Slow milking	15.9251

Sixth week - Speed of milking - Fast.

Feb. 24th A.M.	14.4	5.0	.7200
Feb. 24th P.M.	10.6	4.6	.4876
Feb. 25th A.M.	13.9	4.7	.6533
Feb. 25th P.M.	10.7	4.6	.4922
Feb. 26th A.M.	13.7	4.6	.6302
Feb. 26th P.M.	10.7	4.6	.4922
Feb. 27th A.M.	14.9	4.8	.7152
Feb. 27th P.M.	12.2	4.8	.5856
Feb. 28th A.M.	14.2	4.7	.6674
Feb. 28th P.M.	11.5	4.6	.5290
March 1st A.M.	14.	4.8	.672
March 1st P.M.	12.4	4.8	.5952
March 2d A.M.	14.	4.9	.686
March 2d P.M.	12.2	4.6	.5612
Total for sixth week	179.4	Fast milking	8.4871

Lady Pietertje Parthenea.

----- Six week period -----

Three weeks of slow and three weeks of fast milking.

First week - Speed of milking - Slow.

Date	lbs. milk	test	lbs. fat,
January 20th A.M.	22.4	2.6	.582
Jan. 20th P.M.	20.1	3.3	.6633
Jan. 21st A.M.	22.4	2.6	.5824
Jan. 21st P.M.	20.	3.	.600
Jan. 22d A.M.	23.9	3.	.687
Jan. 22d P.M.	19.5	3.2	.6240
Jan. 23d A.M.	24.3	3.3	.8019
Jan. 23d P.M.	20.6	3.8	.7828
Jan. 24th A.M.	25.7	3.7	.9509
Jan. 24th P.M.	19.2	3.8	.7296
Jan. 25th A.M.	21.4	3.1	.6634
Jan. 25th P.M.	19.3	3.9	.7527
Jan. 26th A.M.	21.8	3.4	.7412
Jan. 26th P.M.	18.4	5.4	.9936
Total for first week	298. slow milking		10.1548

Second and third week - Speed of milking - Fast.

Jan. 27th A.M.	23.4	3.5	.8190
Jan. 27th P.M.	20.L	3.	.6030
Jan. 28th A.M.	24.3	2.8	.6804
Jan. 28th P.M.	17.7	3.2	.5664
Jan. 29th A.M.	24.2	3.1	.7502
Jan. 29th P.M.	20.2	3.4	.6868
Jan. 30th A.M.	24.2	3.6	.8712
Jan. 30th P.M.	19.2	3.3	.6336
Jan. 31st A.M.	25.	2.9	.7250
Jan. 31st P.M.	18.5	3.5	.6475
Feb. 1st A.M.	17.2	3.5	.6020
Feb. 1st P.M.	13.2	4.1	.5412
Feb. 2d A.M.	15.9	4.0	.6360
Feb. 2d. P.M.	13.6	3.7	.5032
Feb. 3d A.M.	20.	3.6	.7200
Feb. 3d P.M.	18.1	3.5	.6335
Feb. 4th A.M.	21.9	3.5	.7665
Feb. 4th P.M.	16.6	3.6	.5976
Feb. 5th A.M.	21.8	3.1	.6758
Feb. 5th P.M.	18.	3.7	.666
Feb. 6th A.M.	22.6	3.1	.7006
Feb. 6th P.M.	18.6	3.2	.5952
Feb. 7th A.M.	22.7	3.2	.7264
Feb. 7th P.M.	15.4	3.	.462
Feb. 8th A.M.	19.	3.	.5700
Feb. 8th P.M.	18.3	3.6	.6588
Feb. 9th A.M.	22.5	2.8	.6300
Feb. 9th P.M.	17.7	3.3	.5841
Total for 2d and 3dwk	549.9 Fast milking		18.252

Lady Pietertje Parthenea.

----- Six week period -----

Fourth and fifth week - Speed of milking - Slow.

Date	lbs. milk	test	lbs. fat,
February 10th A.M.	22.7	3.0	.681
Feb. 10th P.M.	17.5	2.7	.4725
Feb. 11th A.M.	23	2.8	.6440
Feb. 11th P.M.	16.6	3.1	.5146
Feb. 12th A.M.	22.1	2.8	.6288
Feb. 12th P.M.	17.3	2.8	.4844
Feb. 13th A.M.	21.9	3.5	.7665
Feb. 13th P.M.	17.3	3.4	.5882
Feb. 14th A.M.	21.4	3.3	.7062
Feb. 14th P.M.	17.6	3.6	.6336
Feb. 15th A.M.	25.2	3.7	.9324
Feb. 15th P.M.	17.3	3.2	.5536
Feb. 16th A.M.	22.5	3.1	.6975
Feb. 16th P.M.	19.5	3.2	.6240
Feb. 17th A.M.	22.2	3.2	.7104
Feb. 17th P.M.	18.3	3.1	.5673
Feb. 18th A.M.	23.3	3.2	.7456
Feb. 18th P.M.	20	3.9	.780
Feb. 19th A.M.	23.3	3.0	.699
Feb. 19th P.M.	20.6	3.1	.6386
Feb. 20th A.M.	24.3	2.8	.6804
Feb. 20th P.M.	20.1	3.8	.7638
Feb. 21st A.M.	23.4	2.9	.6786
Feb. 21st P.M.	18.7	3.3	.6171
Feb. 22d A.M.	23.5	2.8	.658
Feb. 22d P.M.	22.5	3.6	.8100
Feb. 23d A.M.	24.7	3.	.7410
Feb. 23d P.M.	19.4	3.4	.6596
Total of 4th & 5th wk.	585.2	Slow mliking	18.6767

Sixth week - Speed of milking - Fast.

Feb. 24th A.M.	24.8	3.6	.8928
Feb. 24th P.M.	17.5	3.4	.5950
Feb. 25th A.M.	24.4	2.8	.6832
Feb. 25th P.M.	19.7	3.4	.6698
Feb. 26th A.M.	25.6	2.5	.6400
Feb. 26th P.M.	20.3	3.1	.6293
Feb. 27th A.M.	26.1	3.1	.8091
Feb. 27th P.M.	19.5	3.2	.6240
Feb. 28th A.M.	25.3	3.1	.7843
Feb. 28th P.M.	19.7	3.	.591
March 1st A.M.	24.5	2.9	.7105
March 1st P.M.	20.6	3.5	.7210
March 2d A.M.	25.1	3.1	.7781
March 2d P.M.	20.	3.	.600
Total for 6th week	313.1	Fast milking	9.7281

Zyder Zee Agnes 3d.

----- Six week period.-----

Three weeks of fast and three weeks of slow milking.

First week - Speed of milking - Fast.

Date	lbs milk	test	lbs fat,
January 20th A.M.	19.	2.6	.494
Jan. 20th P.M.	16.9	3.2	.5408
Jan. 21st A.M.	18.8	3.1	.5828
Jan. 21st P.M.	16.3	3.4	.5542
Jan. 22d A.M.	18.4	3.3	.6072
Jan. 22d P.M.	15.1	3.6	.5436
Jan. 23d A.M.	16.4	3.7	.6068
Jan. 23d P.M.	14.3	3.5	.5005
Jan. 24th A.M.	18.6	3.2	.5952
Jan. 24th P.M.	14.2	3.4	.4828
Jan. 25th A.M.	17.3	3.2	.5536
Jan. 25th P.M.	13.6	3.7	.5032
Jan. 26th A.M.	14.9	3.3	.4917
Jan. 26th P.M.	11.7	4.0	.468
Total for first week	225.5	Fast milking	7.5244

Second and third week - Speed of milking - Slow.

Jan. 27th A.M.	13.7	2.5	.3425
Jan. 27th P.M.	15.2	2.6	.3952
Jan. 28th A.M.	16.4	2.4	.3936
Jan. 28th P.M.	15.8	3.2	.5056
Jan. 29th A.M.	17.8	2.5	.4450
Jan. 29th P.M.	14.6	2.8	.4088
Jan. 30th A.M.	16.8	2.8	.4704
Jan. 30th P.M.	15.6	3.0	.468
Jan. 31st A.M.	16.8	2.3	.3864
Jan. 31st P.M.	16.1	3.4	.5474
February 1st A.M.	16.9	2.6	.4394
Feb. 1st P.M.	14.6	3.6	.5256
Feb. 2d A.M.	15.9	2.[illegible]	.4134
Feb. 2d P.M.	14.8	3.4	.5032
Feb. 3d A.M.	19.2	3.8	.7296
Feb. 3d P.M.	13.8	4.4	.6072
Feb. 4th A.M.	18.1	2.6	.4706
Feb. 4th P.M.	16.3	2.9	.4727
Feb. 5th A.M.	18.1	2.8	.5068
Feb. 5th P.M.	16.9	3.8	.6422
Feb. 6th A.M.	19.	3.8	.7220
Feb. 6th P.M.	15.2	3.2	.4864
Feb. 7th A.M.	19.	3.3	.627
Feb. 7th P.M.	16.9	3.6	.6084
Feb. 8th A.M.	23.4	3.	.702
Feb. 8th P.M.	15.7	4.4	.6908
Feb. 9th A.M.	16.8	2.3	.3864
Feb. 9th P.M.	16.4	3.3	.5412
Total 2d and 3d week	466.8	Slow milking	14.4378

Zyder Zee Agnes 3d.

----- Six week period.-----

Fourth and fifth weeks - Speed of milking - Fast.

Date	lbs. milk	test	lbs. fat,
February 10th A.M.	17.5	2.7	.4725
Feb. 10th.P.M.	18.2	5.0	.9100
Feb. 11th A.M.	18.5	3.4	.6290
Feb. 11th P.M.	16.	2.9	.464
Feb. 12th A.M.	20.	3.1	.620
Feb. 12th P.M.	15.2	3.1	.4712
Feb. 13th A.M.	18.4	3.	.5520
Feb. 13th P.M.	14.5	3.8	.5510
Feb. 14th A.M.	16.5	3.2	.5280
Feb. 14th P.M.	14.3	4.0	.5720
Feb. 15th A.M.	18.8	2.9	.5452
Feb. 15th P.M.	14.5	3.2	.4640
Feb. 16th A.M.	18.9	3.	.567
Feb. 16th P.M.	16.8	3.1	.5208
Feb. 17th A.M.	17.5	2.8	.4900
Feb. 17th P.M.	17.9	3.1	.5549
Feb. 18th A.M.	19.4	3.2	.6208
Feb. 18th P.M.	17.9	3.4	.6086
Feb. 19th A.M.	19.5	3.0	.5850
Feb. 19th P.M.	16.2	3.2	.5184
Feb. 20th A.M.	20.2	3.5	.7070
Feb. 20th P.M.	16.8	3.2	.5376
Feb. 21st A.M.	19.7	2.8	.5516
Feb. 21st P.M.	16.3	3.0	.4890
Feb. 22d A.M.	20.6	2.9	.5974
Feb. 22d P.M.	18.3	3.4	.6222
Feb. 23d A.M.	20.4	2.9	.5916
Feb. 23d P.M.	16.1	3.2	.5152
Total 4th and 5th week	488.9	Fast milking	15.856

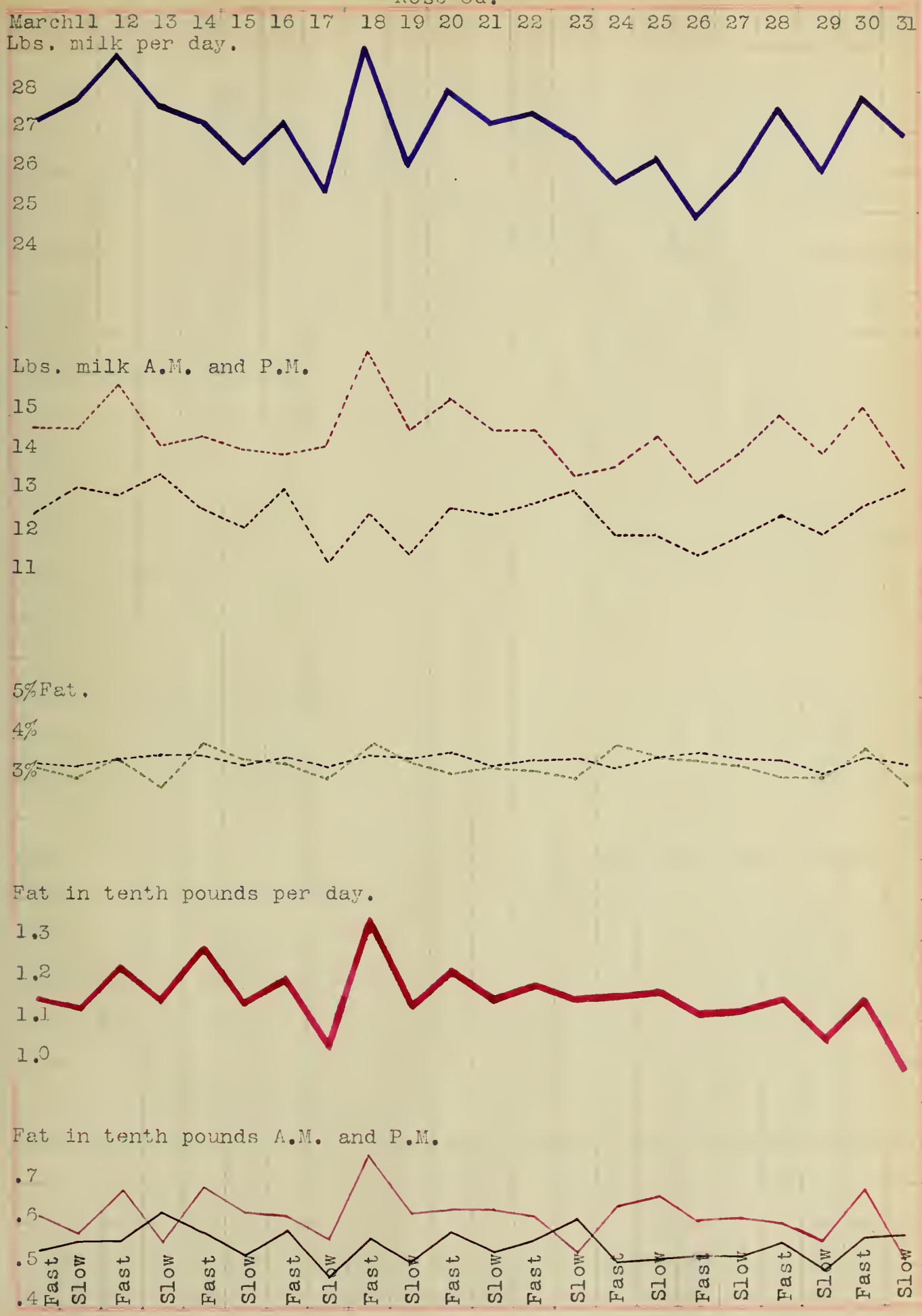
Sixth week - Speed of milking - Slow.

Feb. 24th A.M.	18.4	1.9	.3496
Feb. 24th P.M.	17.4	3.0	.5220
Feb. 25th A.M.	17.4	2.4	.4176
Feb. 25th P.M.	13.	3.5	.455
Feb. 26th A.M.	13.4	3.5	.4690
Feb. 26th P.M.	11.6	4.	.464
Feb. 27th A.M.	14.	3.8	.532
Feb. 27th P.M.	12.6	4.4	.5544
Feb. 28th A.M.	13.6	3.	.408
Feb. 28th P.M.	12.5	3.8	.4750
March 1st A.M.	12.5	2.9	.3625
March 1st P.M.	11.3	3.0	.339
March 2d A.M.	13.4	2.9	.3886
March 2d P.M.	13.1	3.	.393
Tatal for sixth week	144.20	Slow milking	6.1297

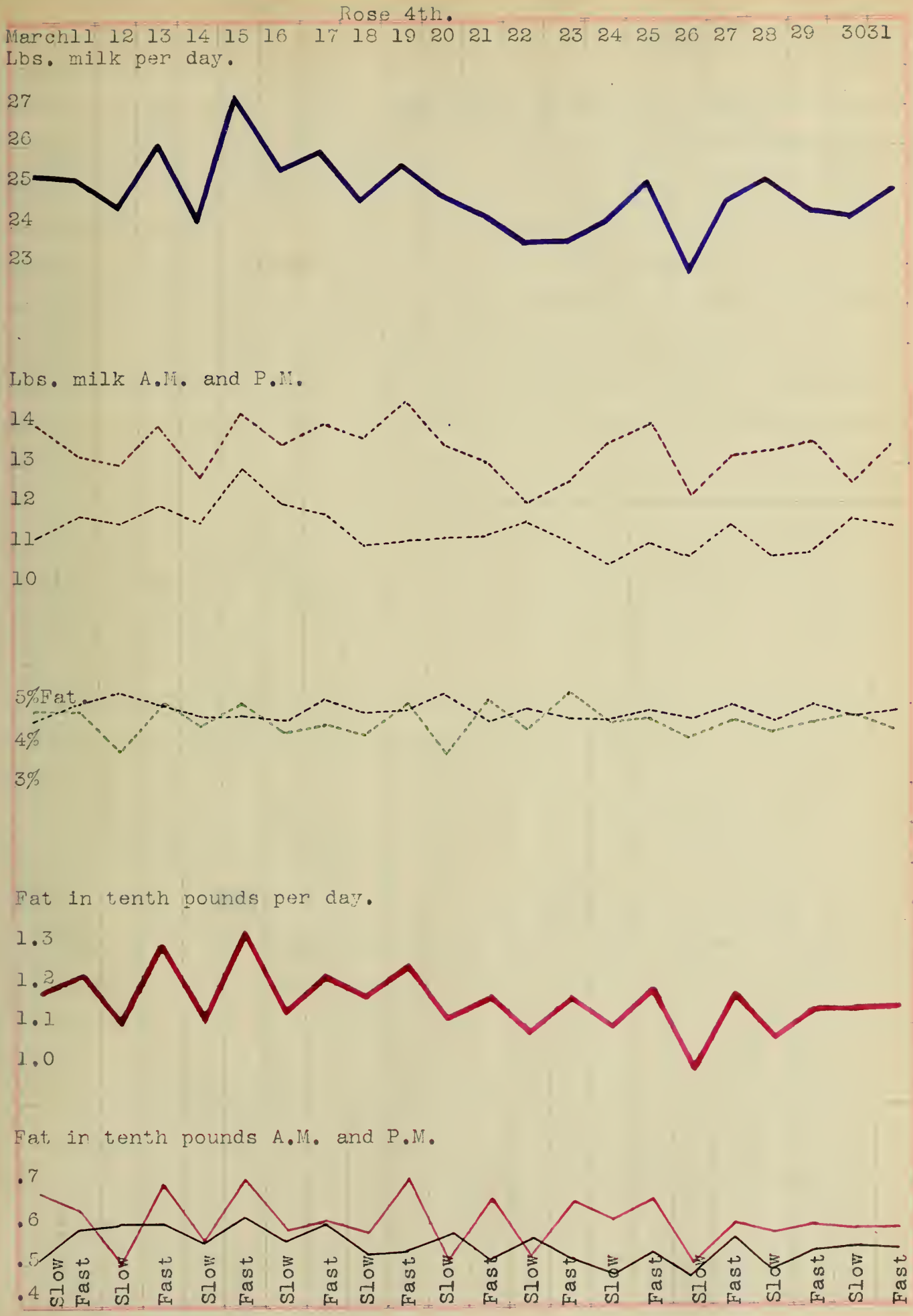
TWENTY-TWO DAY PERIOD.

This period of twenty-two days, eleven of which the cows were milked slowly and the other eleven of which they were milked rapidly, was taken up to substantiate some of the conclusions drawn from the previous period. The speed of milking was changed each day with all four cows. Two were milked slowly and two rapidly as before, but the speed was changed each morning instead of less frequently as had been done previously.

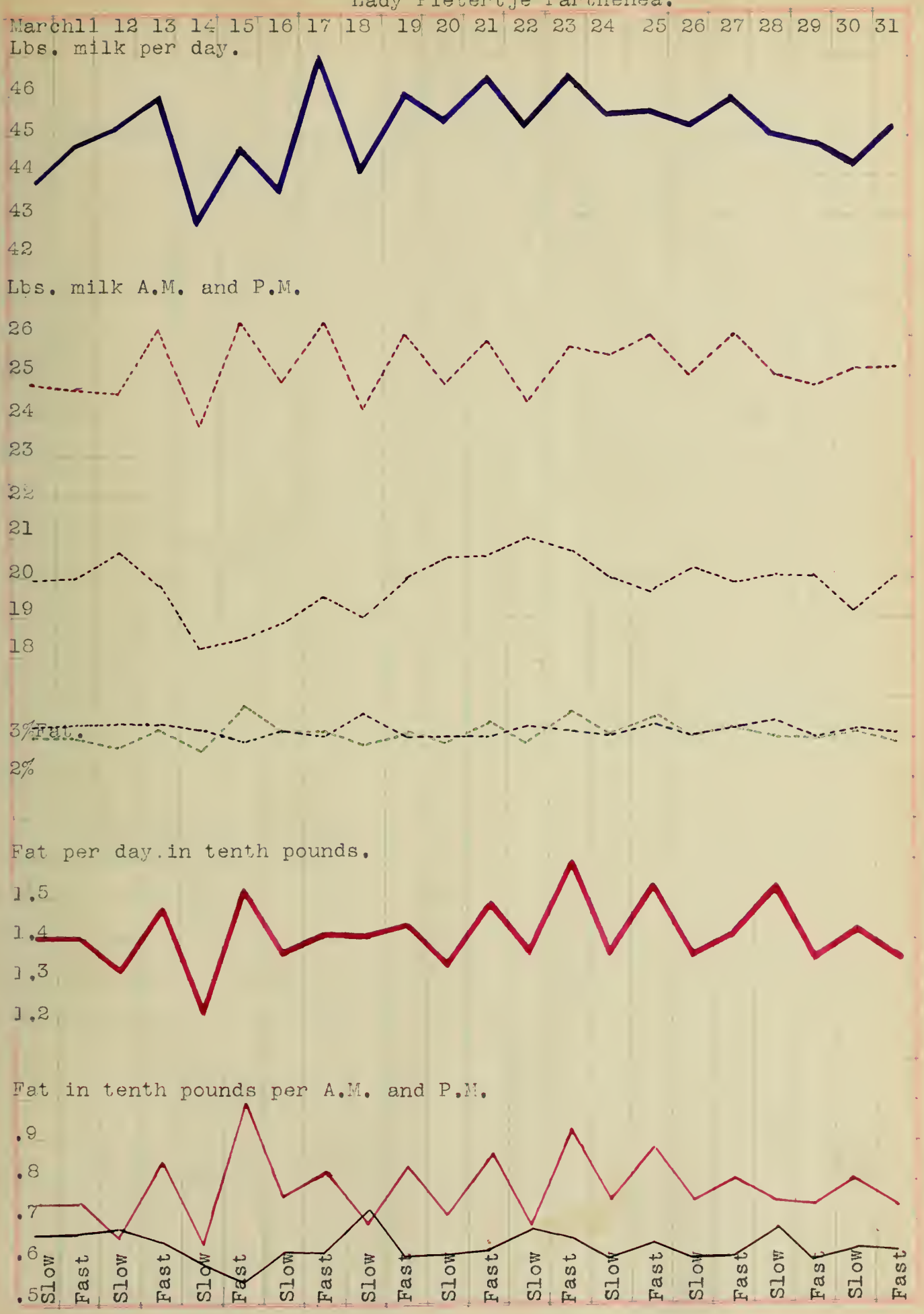
Rose 3d.


March 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Lbs. milk per day.
28
27
26
25
24
Lbs. milk A.M. and P.M.
15
14
13
12
11
5% Fat.
4%
3%
Fat in tenth pounds per day.
1.3
1.2
1.1
1.0
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4
Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow

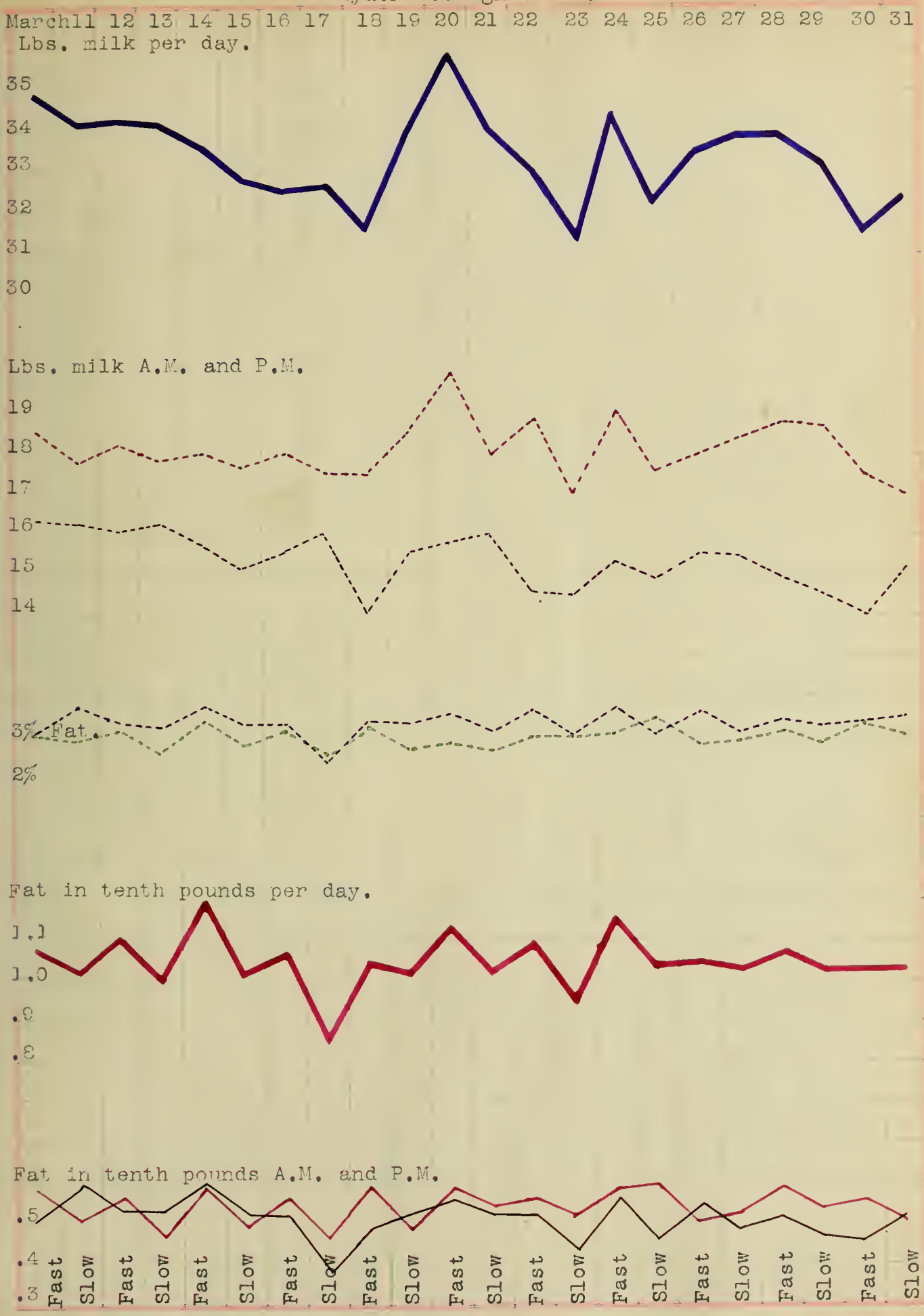
Rose 4th.


March 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Lbs. milk per day.
27
26
25
24
23
Lbs. milk A.M. and P.M.
14
13
12
11
10
5% Fat
4%
3%
Fat in tenth pounds per day.
1.3
1.2
1.1
1.0
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4
Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast Slow Fast

Lady Pietertje Parthenea.



Zyder Zee Agnes 3d.



DISCUSSION OF TWENTY-TWO DAY PERIOD.

The results of this twenty-two day period which are shown in figures on the next page show very plainly the comparitive production of fast and slow milking. During these twenty-two days there were a few slight reverses but the general results are good and show an increase of over nine tenths of a pound of butter fat in eleven days with each of the four cows in favor of the fast milking. Rose 3d's increase of .9556 pound of butter fat with Rose 4th's increase of .9529 pound of butter fat Lady Pietertje Partheneà's" of .956 pound of butter fat and Zyder Zee Agnes' increase of .9444 pound of butter fat make a total in eleven days of just 3.8089 pounds of butter fat while 27.9 pounds more of milk was produced by the fast milking. The production of both milk and butter fat were materially decreased by the slow milking.

Conclusion:

Fast and slow milking have a decided effect upon the production of both milk and butter fat for the first day after the change. More milk and more butter fat are produced by the fast milking.

TWENTY-TWO DAY PERIOD.

TABLE 2.

Table showing comparison of totals for the four cows during the twenty-two day period.

Rose 3d.

The 11 days of fast milking	300.6 lbs. milk	- - -	13.3497 lbs fat.
The 11 days of slow milking	292.8 lbs milk	- - -	12.3941 lbs fat.
Increase due to fast milking	7.8 lbs milk	- - -	.9556 lbs fat.

Rose 4th.

The 11 days of fast milking	276.2 lbs milk	- - -	13.347 lbs fat.
The 11 days of slow milking	267.2 lbs milk	- - -	12.3941 lbs fat.
Increase due to fast milking	9.0 lbs milk	- - -	.9529 lbs fat.

Lady Pietertje Parthenea.

The 11 days of fast milking	502.5 lbs milk	- - -	16.020 lbs fat.
The 11 days of slow milking	490.5 lbs milk	- - -	15.064 lbs fat.
Increase due to fast milking	12.0 lbs milk	- - -	.956 lbs fat.

Zyder Zee Agnes 3d.

The 11 days of fast milking	369.9 lbs milk	- - -	12.0363 lbs fat.
The 11 days of slow milking	365.8 lbs milk	- - -	11.0919 lbs fat.
Increase due to fast milking	4.1 lbs milk	- - -	.9444 lbs fat.

For the actual daily figures see following four pages.

Rose 3d.

----- Twenty-two day period.-----

Eleven days of slow and eleven of fast milking.

Date	Fast lbs.	Slow milk	test	Fast lbs.	Slow Fat.
March 10th A.M.	14.7		4.2	.6174	
March 10th P.M.	12.5		4.3	.5375	
March 11th A.M.		14.7	4.		.588
March 11th P.M.		13.2	4.2		.5544
March 12th A.M.	15.7		4.4	.6908	
March 12th P.M.	13.		4.3	.559	
March 13th A.M.		14.2	3.8		.5396
March 13th P.M.		13.5	4.6		.6210
March 14th A.M.	14.5		4.8	.6960	
March 14th P.M.	12.7		4.6	.5842	
March 15th A.M.		14.1	4.4		.6204
March 15th P.M.		12.2	4.3		.5246
March 16th A.M.	14.		4.4	.616	
March 16th P.M.	13.1		4.5	.5895	
March 17th A.M.		14.2	4.		.5680
March 17th P.M.		11.3	4.2		.4746
March 18th A.M.	16.5		4.8	.7920	
March 18th P.M.	12.5		4.5	.5625	
March 19th A.M.		14.6	4.3		.6278
March 19th P.M.		11.5	4.4		.506
March 20th A.M.	15.3		4.2	.6426	
March 20th P.M.	12.7		4.6	.5842	
March 21st A.M.		14.7	4.3		.6321
March 21st P.M.		12.5	4.3		.5375
March 22d A.M.	14.7		4.2	.6174	
March 22d P.M.	12.7		4.4	.5588	
March 23d A.M.		13.6	4.		.5440
March 23d P.M.		13.3	4.6		.6118
March 24th A.M.	13.8		4.8	.6624	
March 24th P.M.	12.		4.2	.504	
March 25th A.M.		14.4	4.6		.6624
March 25th P.M.		12.	4.4		.528
March 26th A.M.	13.4		4.5	.6030	
March 26th P.M.	11.5		4.6	.5290	
March 27th A.M.		14.	4.3		.602
March 27th P.M.		12.	4.4		.528
March 28th A.M.	15.		4.	.600	
March 28th P.M.	12.5		4.4	.550	
March 29th A.M.		14.	4.		.560
March 29th P.M.		12.	4.		.480
March 30th A.M.	15.1		4.6	.6946	
March 30th P.M.	12.7		4.4	.5588	
March 31st A.M.		13.7	3.8		.5206
March 31st P.M.		13.1	4.3		.5633
Totals for Slow		292.8			12.3941
Totals for Fast	300.6			13.3497	

Rose 4th.

----- Twenty-two day period.-----

Eleven days of slow and eleven days of fast milking.

Date	Fast lbs milk	Slow lbs milk	test	Fast lbs. fat.	Slow lbs. fat.
March 10th A.M.		14.	4.8		.6720
March 10th P.M.		11.2	4.6		.5152
March 11th A.M.	13.3		4.8	.6384	
March 11th P.M.	11.8		5.	.590	
March 12th A.M.		13.	3.9		.507
March 12th P.M.		11.5	5.3		.6095
March 13th A.M.	14.		5.	.700	
March 13th P.M.	12.		5.	.600	
March 14th A.M.		12.7	4.4		.5588
March 14th P.M.		11.5	4.8		.5520
March 15th A.M.	14.3		5.	.7150	
March 15th P.M.	12.9		4.8	.6192	
March 16th A.M.		13.5	4.3		.5805
March 16th P.M.		12.	4.6		.552
March 17th A.M.	14.		4.4	.616	
March 17th P.M.	11.8		5.1	.6018	
March 18th A.M.		13.7	4.2		.5754
March 18th P.M.		11.	4.8		.528
March 19th A.M.	14.5		5.	.725	
March 19th P.M.	11.		4.9	.539	
March 20th A.M.		13.5	3.9		.5265
March 20th P.M.		11.2	5.2		.5824
March 21st A.M.	13.		5.1	.663	
March 21st P.M.	11.2		4.6	.5152	
March 22d A.M.		12.	4.4		.528
March 22d P.M.		11.5	4.9		.5635
March 23d A.M.	12.5		5.2	.6500	
March 23d P.M.	11.1		4.6	.5106	
March 24th A.M.		13.5	4.6		.6210
March 24th P.M.		10.5	4.6		.4830
March 25th A.M.	14.		4.7	.658	
March 25th P.M.	11.		4.9	.539	
March 26th A.M.		12.2	4.1		.5002
March 26th P.M.		10.6	4.6		.4876
March 27th A.M.	13.1		4.6	.6026	
March 27th P.M.	11.5		5.0	.575	
March 28th A.M.		13.3	4.3		.5719
March 28th P.M.		10.7	4.6		.4922
March 29th A.M.	13.4		4.5	.6030	
March 29th P.M.	10.9		5.0	.5450	
March 30th A.M.		12.5	4.7		.5875
March 30th P.M.		11.6	4.7		.5452
March 31st A.M.	13.5		4.4	.5940	
March 31st P.M.	11.4		4.8	.5472	
Total for Fast	276.20			13.3470	
Total for Slow		267.20			12.1394

Lady Pietertje Parthenea.

----- Twenty-two day period.-----

Eleven days of slow and eleven days of fast milking.

Date	Fast lbs. milk	Slow	test	Fast lbs. fat.	Slow
March 10th A.M.		24.9	3.0		.7470
March 10th P.M.		20.0	3.3		.6600
March 11th A.M.	24.7		3.	.741	
March 11th P.M.	20.		3.3	.6600	
March 12th A.M.		24.6	2.7		.6642
March 12th P.M.		20.6	3.3		.6798
March 13th A.M.	26.2		3.2	.8384	
March 13th P.M.	19.8		3.3	.6534	
March 14th A.M.		23.7	2.7		.6399
March 14th P.M.		18.2	3.2		.5824
March 15th A.M.	26.3		3.8	.9994	
March 15th P.M.	18.3		2.9	.5307	
March 16th A.M.		24.8	3.1		.7688
March 16th P.M.		18.9	3.2		.6048
March 17th A.M.	26.4		3.1	.8184	
March 17th P.M.	20.5		3.	.615	
March 18th A.M.		24.1	2.9		.6989
March 18th P.M.		20.	3.6		.720
March 19th A.M.	26.		3.2	.832	
March 19th P.M.	20.		3.	.600	
March 20th A.M.		24.8	2.9		.7192
March 20th P.M.		20.5	3.		.6150
March 21st A.M.	25.9		3.4	.8806	
March 21st P.M.	20.5		3.	.6150	
March 22d A.M.		24.4	2.8		.6832
March 22d P.M.		21.	3.3		.6930
March 23d A.M.	25.7		3.6	.9252	
March 23d P.M.	20.7		3.2	.6624	
March 24th A.M.		25.5	3.		.7650
March 24th P.M.		20.	3.		.6000
March 25th A.M.	26.		3.4	.8840	
March 25th P.M.	19.6		3.3	.6468	
March 26th A.M.		25.	3.		.750
March 26th P.M.		20.2	3.0		.606
March 27th A.M.	26.		3.1	.806	
March 27th P.M.	19.9		3.1	.6169	
March 28th A.M.		25.	3.		.750
March 28th P.M.		20.	3.4		.680
March 29th A.M.	24.8		3.	.7440	
March 29th P.M.	20.		3.	.600	
March 30th A.M.		25.1	3.2		.8032
March 30th P.M.		19.2	3.3		.6336
March 31st A.M.	25.2		2.9	.7308	
March 31st P.M.	20.		3.1	.620	
Totals Fast	502.5			16.020	
Totals for Slow		490.5			15.064

Zyder Zee Agnes 3d.

----- Twenty-two day period.-----

Eleven days of slow and eleven days of fast milking.

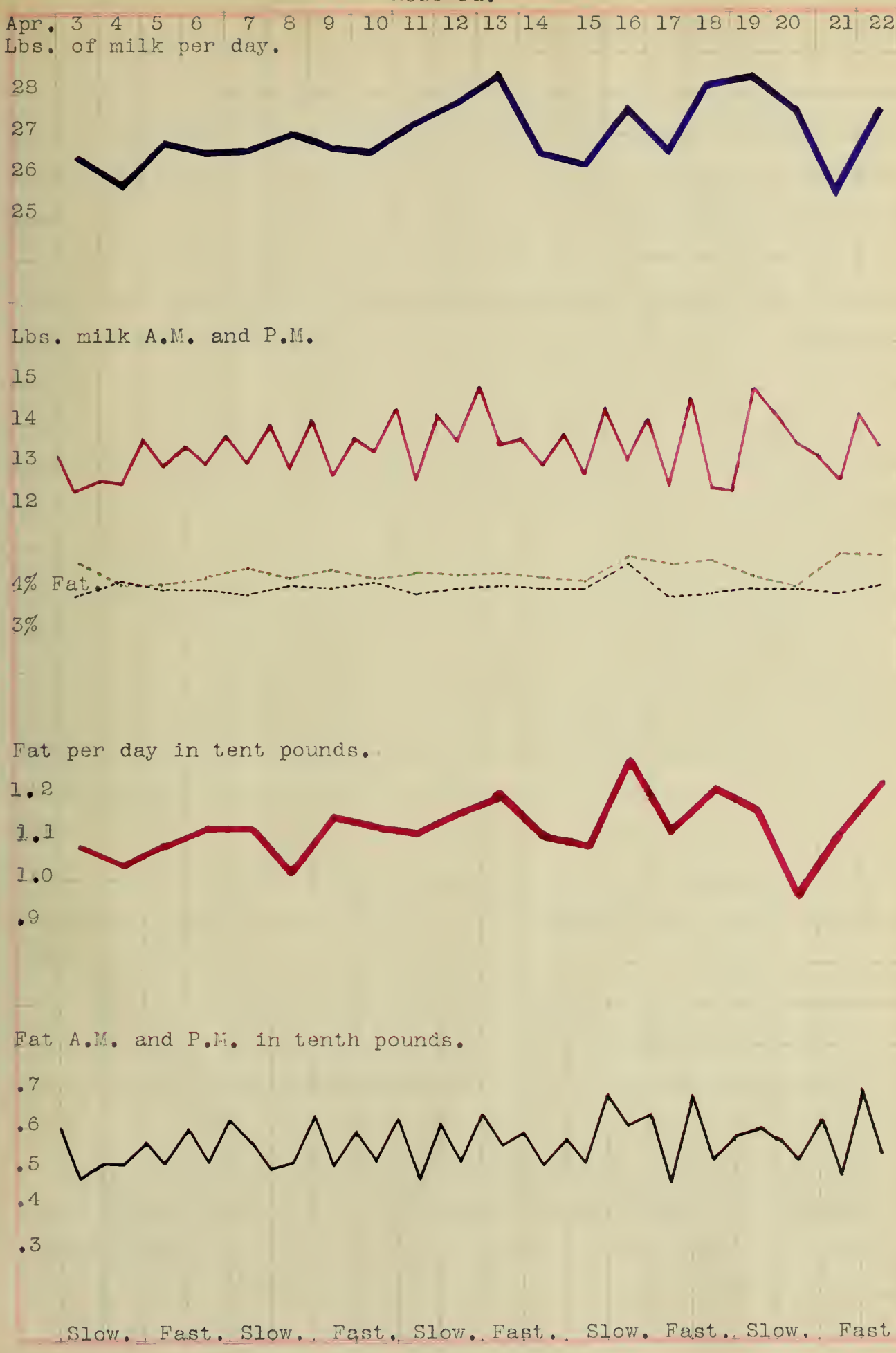
Date	Fast lbs. milk	Slow lbs. milk	test	Fast lbs. fat.	Slow lbs. fat.
March 10th A.M.	18.5		3.1	.5735	
March 10th P.M.	16.3		3.1	.5053	
March 11th A.M.		17.9	2.9		.5191
March 11th P.M.		16.2	3.7		.5994
March 12th A.M.	18.2		3.1	.5642	
March 12th P.M.	16.		3.4	.544	
March 13th A.M.		17.8	2.6		.4628
March 13th P.M.		16.3	3.3		.5379
March 14th A.M.	18.		3.3	.594	
March 14th P.M.	15.7		3.8	.5966	
March 15th A.M.		17.7	2.8		.4956
March 15th P.M.		15.2	3.4		.5168
March 16th A.M.	18.		3.1	.558	
March 16th P.M.	15.5		3.3	.5115	
March 17th A.M.		17.6	2.6		.4576
March 17th P.M.		16.	2.4		.384
March 18th A.M.	17.6		3.3	.5808	
March 18th P.M.	14.		3.4	.4760	
March 19th A.M.		18.5	2.7		.4995
March 19th P.M.		15.5	3.4		.5270
March 20th A.M.	20		2.9	.5800	
March 20th P.M.	15.8		3.5	.5530	
March 21st A.M.		18.	2.8		.504
March 21st P.M.		16.	3.2		.512
March 22d A.M.	18.7		3.0	.561	
March 22d P.M.	14.5		3.6	.522	
March 23d A.M.		17.	3.		.5100
March 23d P.M.		14.5	3.		.435
March 24th A.M.	19.		3.1	.589	
March 24th P.M.	15.3		3.7	.5661	
March 25th A.M.		17.5	3.4		.595
March 25th P.M.		14.8	3.1		.4588
March 26th A.M.	18.		2.8	.504	
March 26th P.M.	15.5		3.5	.5425	
March 27th A.M.		18.4	2.9		.5336
March 27th P.M.		15.4	3.2		.4928
March 28th A.M.	18.8		3.1	.5828	
March 28th P.M.	15.		3.4	.510	
March 29th A.M.		18.7	2.9		.5423
March 29th P.M.		14.5	3.3		.4785
March 30th A.M.	17.5		3.2	.5600	
March 30th P.M.	14.		3.3	.4620	
March 31st A.M.		17.	3.		.510
March 31st P.M.		15.3	3.4		.5202
Totals for Slow		365.8			11.0919
Totals Fast	369.9			12.0363	

THE TWENTY DAY PERIOD.

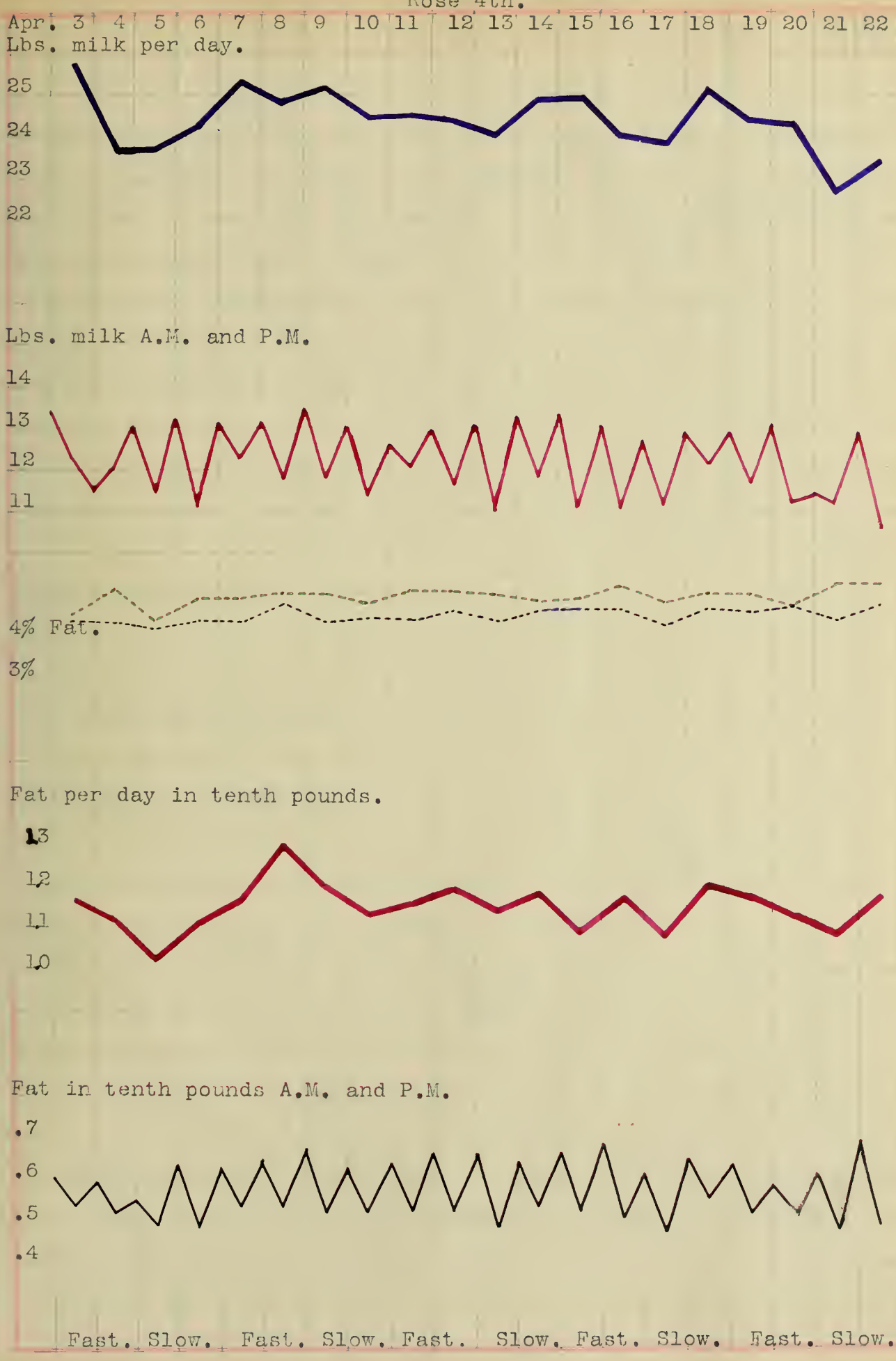
This twenty day period was planned with the view of determining more definitely how long the effect of the change in speed of milking could be noted. It was desired also to learn just which milking after the change was effected most. For this purpose the length of time between milkings was changed so as to make the milkings just twelve hours apart. The cows had been milked eleven and thirteen hours apart. This change enabled us to make a single curve for both the morning and evening flow of milk and also for the butter fat instead of making two separate curves for each as had been done up to this time. The narrow red line as may be seen on the next four pages of curves was used to represent the flow of milk for both morning and evening, both being included in the same line. while the black line was used for the curve representing the morning and evening production of butter fat.

This period of the investigation was carried on in the same manner as the twenty-two day period except for the change in time of milking as stated above and the speed of milking instead of being changed every day was changed every other day making two days of fast milking follow two of slow and vice versa.

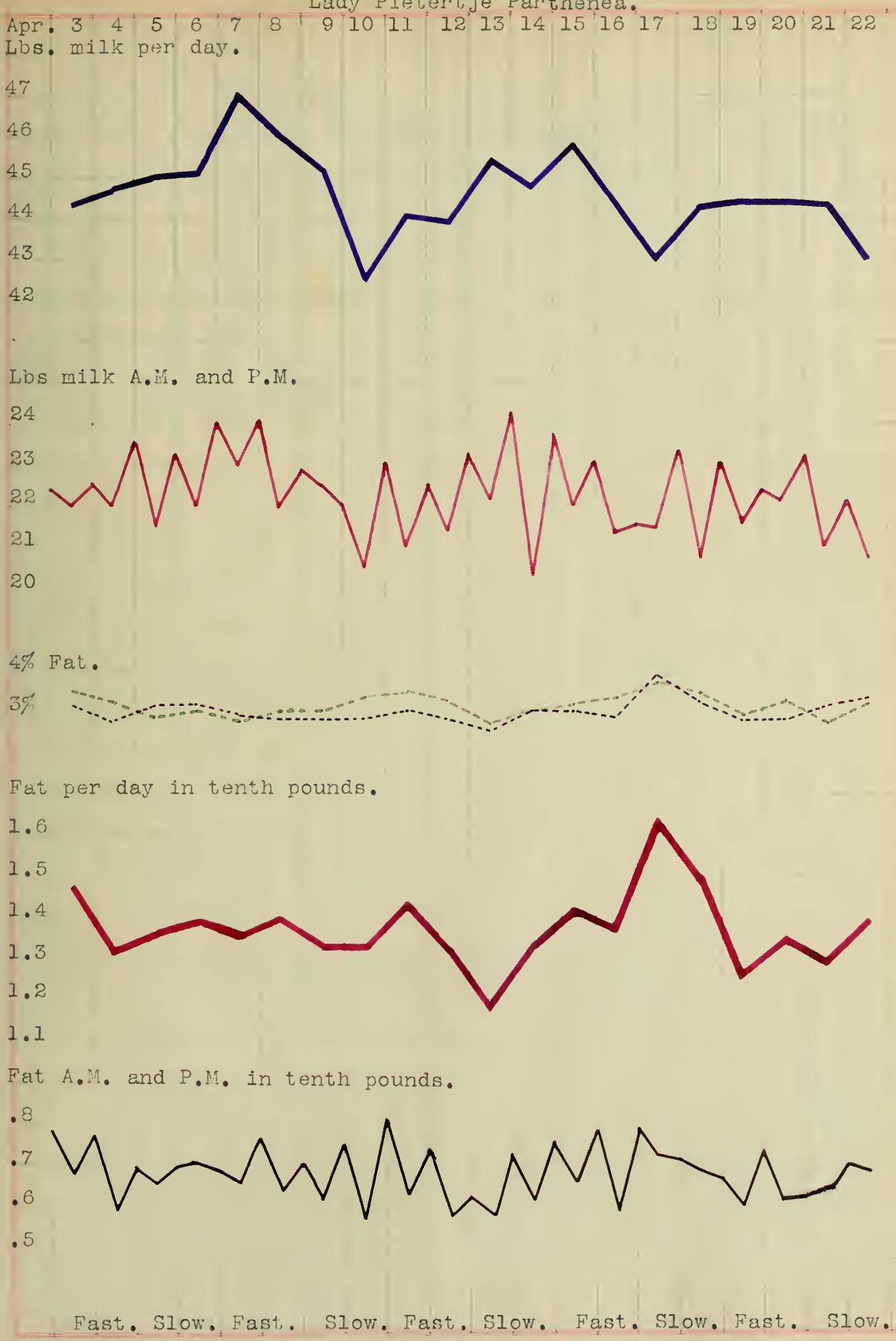
Rose 3d.


Apr. 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Lbs. of milk per day.
28
27
26
25
Lbs. milk A.M. and P.M.
15
14
13
12
4% Fat.
3%
Fat per day in tent pounds.
1.2
1.1
1.0
.9
Fat A.M. and P.M. in tenth pounds.
.7
.6
.5
.4
.3
Slow. Fast. Slow. Fast. Slow. Fast. Slow. Fast. Slow. Fast.

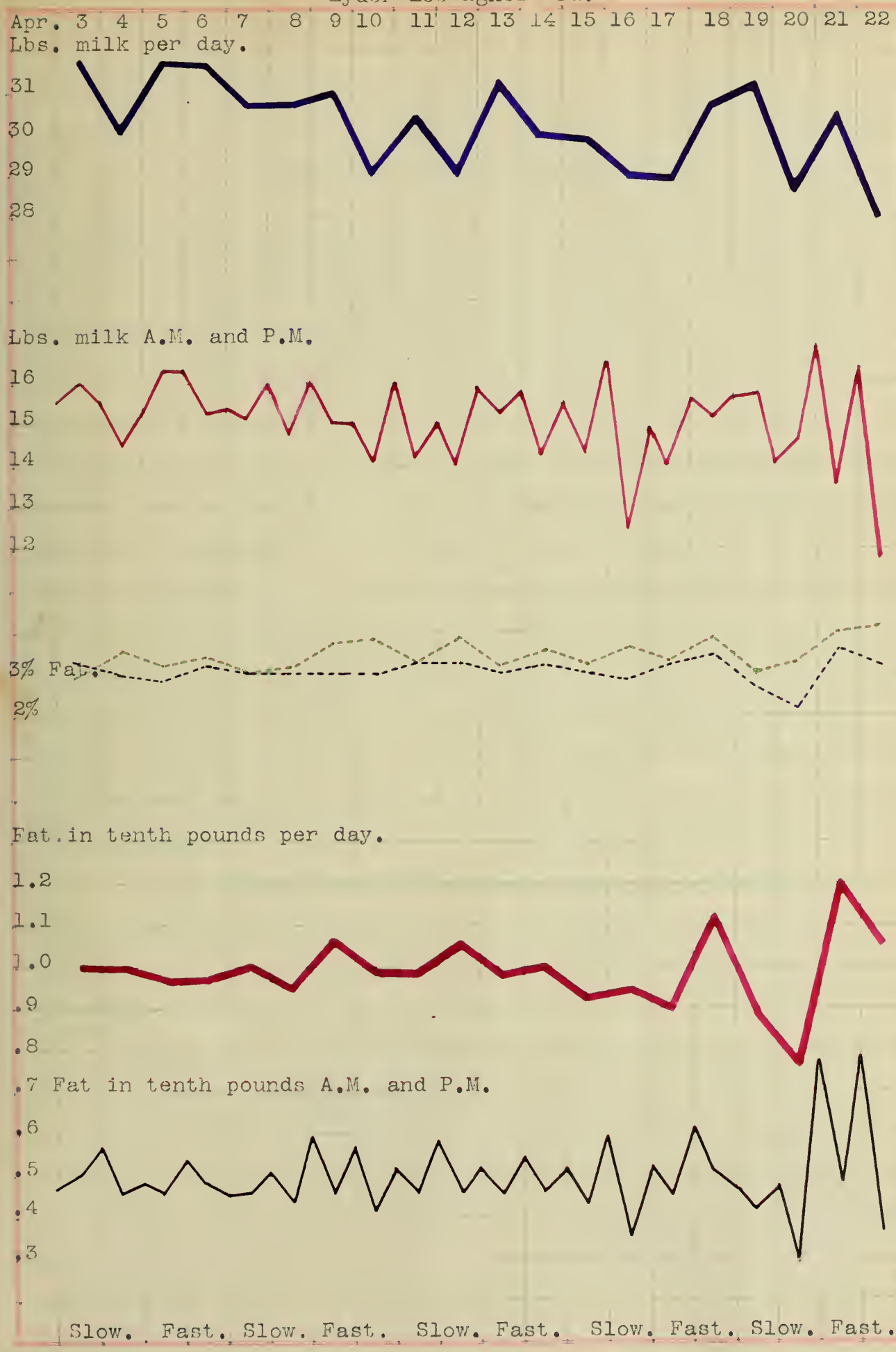
Rose 4th.


Apr. 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Lbs. milk per day.
25
24
23
22
Lbs. milk A.M. and P.M.
14
13
12
11
4% Fat.
3%
Fat per day in tenth pounds.
1.3
1.2
1.1
1.0
Fat in tenth pounds A.M. and P.M.
.7
.6
.5
.4
Fast. Slow. Fast. Slow. Fast. Slow. Fast. Slow. Fast. Slow.

Lady Pietertje Parthenea.



Zyder Zee Agnes 3d.



DISCUSSION OF TWENTY DAY PERIOD.

Even though the milkings were changed to exactly twelve hours apart the cows still usually gave more milk in the morning than in the evening. This variation in the morning and evening flow made the lines very zig-zag and as the afternoon milkings are all down and the morning milkings all up it is difficult to say which milking varried most on account of the change in speed. The one very evident result from this period is, however, that it shows plainly that the variations due to change in speed of milking are not lasting. Table three on the following page shows that although all four of the cows give a variation in favor of the fast milking yet the results do not begin to show the contrast that they did in the previous period when the speed of milking was changed every day instead of every other day.

Conclusion:

After one day of fast or slow milking a cow becomes accustomed to the speed and very little variation in her production can be traced to the speed of milking after the first day of the change.

TWENTY DAY PERIOD.

TABLE 3.

Table showing comparison of totals for the four cows during the twenty day period.

Rose 3d.

The 10 days of fast milking	269.9 lbs milk	- - -	11.4735 lbs fat.
The 10 days of slow milking	268.9 lbs milk	- - -	11.36 lbs fat.
Increase due to fast milking	1.0 lb. milk	- - -	.1135 lbs fat.

Rose 4th.

The 10 days of fast milking	245.3 lbs milk	- - -	11.6308 lbs fat.
The 10 days of slow milking	241.3 lbs milk	- - -	11.3823 lbs fat.
Increase due to fast milking	4.0 lbs milk	- - -	.2485 lbs fat.

Lady Pietertje Parthenea.

The 10 days of fast milking	448.7 lbs milk	- - -	14.2121 lbs fat.
The 10 days of slow milking	442.3 lbs milk	- - -	13.7592 lbs fat.
Increase due to fast milking	6.4 lbs milk	- - -	.5529 lbs fat.

Zyder Zee Agnes 3d.

The 10 days of fast milking	302.3 lbs milk	- - -	10.3195 lbs fat.
The 10 days of slow milking	300.9 lbs milk	- - -	9.4356 lbs fat.
Increase due to fast milking	2.4 lbs milk	- - -	.8839 lbs fat.

For the actual daily figures see following four pages.

Rose 3d.

----- Twenty day period. -----

Ten days of slow and ten days of fast milking.

Date	Fast lbs. milk	Slow lbs. milk	Fast test	Slow test	Fast lbs fat.	Slow lbs fat.
April 3d A.M.		13.3	4.6			.6118
April 3d P.M.		12.3	3.9			.4798
April 4th A.M.		12.5	4.2			.5250
April 4th P.M.		12.4	4.2			.5208
April 5th A.M.	13.7		4.1		.5617	
April 5th P.M.	13.		4.		.5200	
April 6th A.M.	13.5		4.4		.5940	
April 6th P.M.	13.1		4.		.5240	
April 7th A.M.		13.6	4.5			.6120
April 7th P.M.		13.	3.9			.507
April 8th A.M.		14.	4.3			.602
April 8th P.M.		13.	4.			.520
April 9th A.M.	14.1		4.5		.6345	
April 9th P.M.	12.8		4.0		.512	
April 10th A.M.	13.5		4.3		.5805	
April 10th P.M.	13.2		4.1		.5412	
April 11th A.M.		14.3	4.4			.6556
April 11th P.M.		12.8	3.9			.4992
April 12th A.M.		14.2	4.4			.6248
April 12th P.M.		13.5	4.0			.540
April 13th A.M.	14.9		4.4		.6556	
April 13th P.M	13.5		4.1		.5535	
April 14th A.M.	13.6		4.3		.5848	
April 14th P.M.	13.		4.		.5200	
April 15th A.M.		13.7	4.2			.5754
April 15th P.M.		12.8	4.			.512
April 16th A.M.		14.4	4.8			.6912
April 16th P.M.		13.2	4.6			.6072
April 17th A.M.	14.1		4.6		.6486	
April 17th P.M.	12.5		3.8		.4750	
April 18th A.M.	14.6		4.7		.6862	
April 18th P.M.	13.5		3.9		.5265	
April 19th A.M.		13.4	4.3			.5762
April 19th P.M.		14.9	4.0			.5960
April 20th A.M.		14.1	4.0			.5640
April 20th P.M.		13.5	4.0			.540
April 21st A.M.	13.1		4.8		.6288	
April 21st P.M.	12.6		3.9		.4914	
April 22d A.M.	14.2		4.9		.6958	
April 22d P.M.	13.4		4.1		.5494	
Totals Fast	269.9				11.4735	
					4335	
Totals for Slow		268.9				11.36

Rose 4th.

----- Twenty day period. -----

Ten days of slow and ten days of fast milking.

Date	Fast lbs. milk	Slow lbs. milk	test	Fast lbs. fat.	Slow lbs. fat.
April 3d A.M.	13.2		4.6	.6072	
April 3d P.M.	12.4		4.4	.5456	
April 4th A.M.	11.5		5.2	.5980	
April 4th P.M.	12.		4.4	.5280	
April 5th A.M.		12.	4.5		.540
April 5th P.M.		11.5	4.3		.4945
April 6th A.M.		13.2	4.8		.6336
April 6th P.M.		11.2	4.4		.4928
April 7th A.M.	13.		4.9	.637	
April 7th P.M.	12.3		4.4	.5412	
April 8th A.M.	13.1		5.	.655	
April 8th P.M.	11.8		4.6	.5428	
April 9th A.M.		13.4	5.		.670
April 9th P.M.		11.8	4.5		.531
April 10th A.M.		13.	4.8		.6240
April 10th P.M.		11.5	4.6		.529
April 11th A.M.	12.5		5.1	.6375	
April 11th P.M.	12.		4.4	.528	
April 12th A.M.	12.9		5.1	.6579	
April 12th P.M.	11.5		4.6	.529	
April 13th A.M.		13.	5.		.65
April 13th P.M.		11.	4.4		.484
April 14th A.M.		13.2	4.8		.6336
April 14th P.M.		11.7	4.6		.5382
April 15th A.M.	13.3		4.9	.6517	
April 15th P.M.	11.2		4.6	.5152	
April 16th A.M.	13.		5.2	.676	
April 16th P.M.	11.		4.6	.506	
April 17th A.M.		12.6	4.8		.6048
April 17th P.M.		11.2	4.3		.4816
April 18th A.M.		12.9	5.		.645
April 18th P.M.		12.1	4.6		.5566
April 19th A.M.	12.7		5.	.6350	
April 19th P.M.	11.7		4.5	.5265	
April 20th A.M.	13.		4.6	.5980	
April 20th P.M.	11.2		4.6	.5152	
April 21st A.M.		11.4	5.3		.6042
April 21st P.M.		11.2	4.4		.4928
April 22d A.M.		12.8	5.3		.6784
April 22d P.M.		10.6	4.7		.4982
Totals for Slow		241.3			11.3823
Totals Fast	245.3			11.6308	

Lady Pietertje Parthenea.

----- Twenty day period.-----

Ten days of slow and ten days of fast milking.

Date	Fast lbs. milk	Slow lbs. milk	test	Fast lbs. fat.	Slow lbs. fat.
April 3d A.M.	22.4		3.5	.7840	
April 3d P.M.	22.		3.1	.6820	
April 4th A.M.	22.5		3.4	.7650	
April 4th P.M.	22.		2.7	.594	
April 5th A.M.		23.5	2.9		.6815
April 5th P.M.		21.5	3.1		.6665
April 6th A.M.		23.2	3.		.696
April 6th P.M.		22.	3.2		.704
April 7th A.M.	24.		2.9	.696	
April 7th P.M.	23.		2.9	.667	
April 8th A.M.	24.		3.2	.768	
April 8th P.M.	22.		2.9	.638	
April 9th A.M.		22.8	3.1		.7068
April 9th P.M.		22.5	2.8		.6300
April 10th A.M.		22.	3.4		.7480
April 10th P.M.		20.5	2.8		.5740
April 11th A.M.	23.		3.5	.805	
April 11th P.M.	21.		3.	.630	
April 12th A.M.	22.5		3.3	.7425	
April 12th P.M.	21.4		2.7	.5778	
April 13th A.M.		23.1	2.7		.6237
April 13th P.M.		22.1	2.6		.5746
April 14th A.M.		24.2	3.0		.726
April 14th P.M.		20.5	3.		.615
April 15th A.M.	23.7		3.2	.7584	
April 15th P.M.	22.		3.	.6600	
April 16th A.M.	23.		3.4	.782	
April 16th P.M.	21.3		2.8	.5964	
April 17th A.M.		21.5	3.7		.7955
April 17th P.M.		21.5	3.9		.8385
April 18th A.M.		23.4	3.5		.8190
April 18th P.M.		20.7	3.3		.6831
April 19th A.M.	23.		2.9	.667	
April 19th P.M.	21.5		2.8	.6020	
April 20th A.M.	22.3		3.3	.7359	
April 20th P.M.	22.1		2.8	.6188	
April 21st A.M.		23.3	2.7		.6291
April 21st P.M.		21.	3.1		.651
April 22d A.M.		22.1	3.2		.7072
April 22d P.M.		20.9	3.3		.6897
Totals for Slow		442.3			13.7592
Total Fast	448.7			14.2121	

13.7098

Zyder Zee Agnes 3d.

----- Twenty day period.------

Ten days of slow and ten days of fast milking.

Date	Fast lbs milk	Slow lbs milk	Fast test	Slow test	Fast lbs. fat.	Slow lbs. fat.
April 3d A.M.		15.7		3.		.471
April 3d P.M.		16.		3.2		.512
April 4th A.M.		15.5		3.6		.558
April 4th P.M.		14.5		3.		.435
April 5th A.M.	15.3		3.2		.4896	
April 5th P.M.	16.3		2.9		.4727	
April 6th A.M.	16.3		3.3		.5379	
April 6th P.M.	15.3		3.2		.4896	
April 7th A.M.		15.4		3.		.462
April 7th P.M.		15.3		3.		.459
April 8th A.M.		16.		3.2		.512
April 8th P.M.		14.7		3.		.441
April 9th A.M.	16.		3.7		.592	
April 9th P.M.	15.		3.1		.465	
April 10th A.M.	15.		3.8		.570	
April 10th P.M.	14.1		3.		.423	
April 11th A.M.		16.		3.3		.528
April 11th P.M.		14.2		3.3		.4686
April 12th A.M.		15.		3.9		.585
April 12th P.M.		14.		3.3		.462
April 13th A.M.	15.8		3.3		.5214	
April 13th P.M.	15.3		3.0		.459	
April 14th A.M.	15.6		3.5		.5460	
April 14th P.M.	14.4		3.2		.4608	
April 15th A.M.		15.5		3.3		.5115
April 15th P.M.		14.3		3.		.429
April 16th A.M.		16.5		3.6		.5940
April 16th P.M.		12.5		2.8		.350
April 17th A.M.	14.8		3.4		.5032	
April 17th P.M.	14.		3.2		.4480	
April 18th A.M.	15.5		3.9		.6045	
April 18th P.M.	15.2		3.4		.5168	
April 19th A.M.		15.5		3.0		.4650
April 19th P.M.		15.7		2.7		.4239
April 20th A.M.		14.		3.3		.462
April 20th P.M.		14.6		2.1		.3066
April 21st A.M.	16.9		4.0		.676	
April 21st P.M.	13.5		3.6		.486	
April 22d A.M.	16.2		4.2		.6804	
April 22d P.M.	11.8		3.2		.3776	
Totals Fast	302.3				10.3195	
Totals for Slow milking		300.9				9.4356

FINAL DISCUSSION AND CONCLUSIONS.

The conclusions thus far drawn from the preliminary work and the three periods are as follows.

Cows vary considerably in their production from day to day even though there is no apparent cause.

Cows are influenced in their production by slow or rapid milking and will fall off in production when changed from rapid to slow milking, but will adapt themselves to slow milking so quickly that it will not perceptably lower the production for a long period.

The change from rapid to slow milking is more the cause of the lower production than the actual slow milking.

Fast and slow milking have a decided effect upon the production of both milk and butter fat for the first day after the change.

More milk and more butter fat are produced by the fast milking.

After one day of fast or slow milking a cow becomes accustomed to the speed and very little variation can be traced to the speed of milking after the first day of the change.

The final conclusion to be drawn from this investigation is that a change from rapid to slow milking will lessen the production and conversely,a change from slow to fast will increase the production, but neither effect will be of long duration and a uniform speed is more essential than rapid milking.